YACHTING

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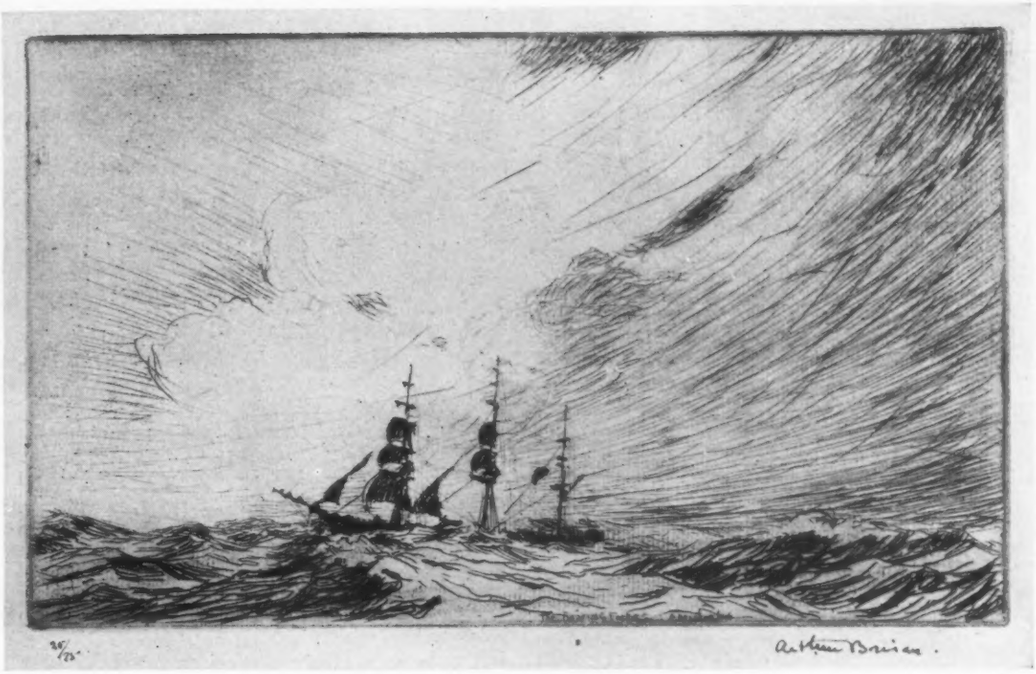


"The Roaring Forties." From an etching by Arthur Briscoe
(Courtesy Harlow McDonald & Co.)

Big Winds and Little Breezes

By CHARLES FITZHUGH TALMAN

Author of "The Realm of the Air," "Our Weather," etc.

MEN have gone sailing over the seven seas for a multitude of purposes, and two, to my knowledge, made long voyages for the sake of sampling different varieties of wind and weather. One of these was the British meteorologist Abercromby, who garnered his discoveries into a delightful book entitled "Seas and Skies in Many Latitudes." The other was the late Professor Ward, of Harvard, foremost of American climatologists. The fruit of Ward's travels would have been, but for his untimely death, a long-projected guidebook to the world's weather and climates.

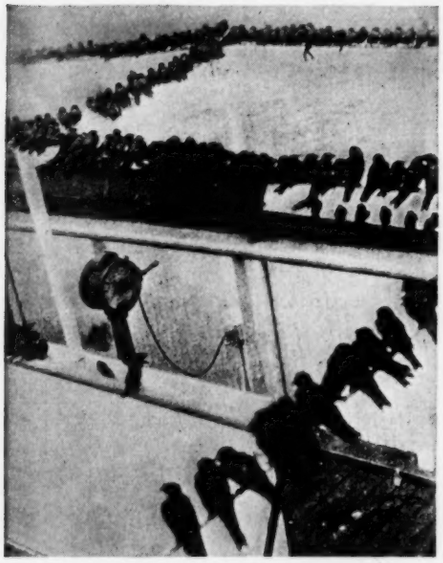
The idea is not patented. Some day an American yachtsman, with plenty of time on his hands and no more amusing way of spending it, will embark upon a personal exploration of ocean winds. It is rather astonishing that one has not done so already.

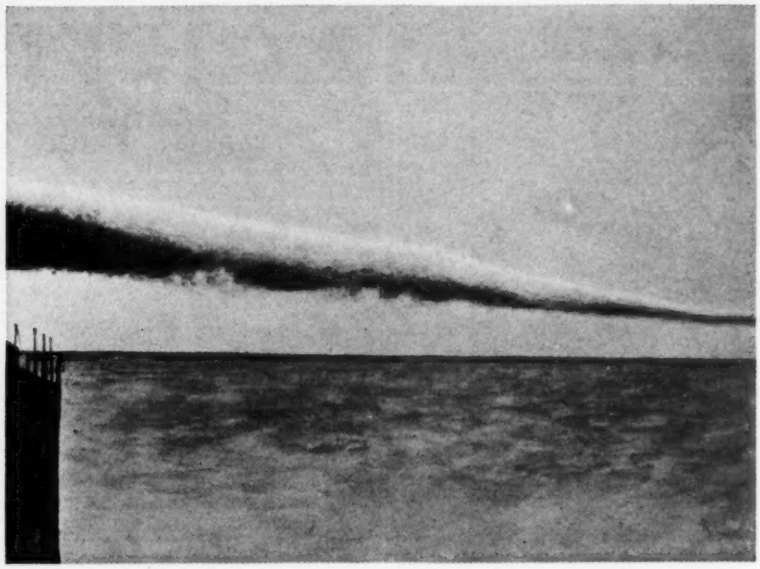
An artist is not content to *read* about the Sistine Madonna. At his first opportunity he goes to the Dresden Gallery to behold this masterpiece for himself. Why should not a sailor be similarly moved to make pilgrimages to the haunts of famous breezes?

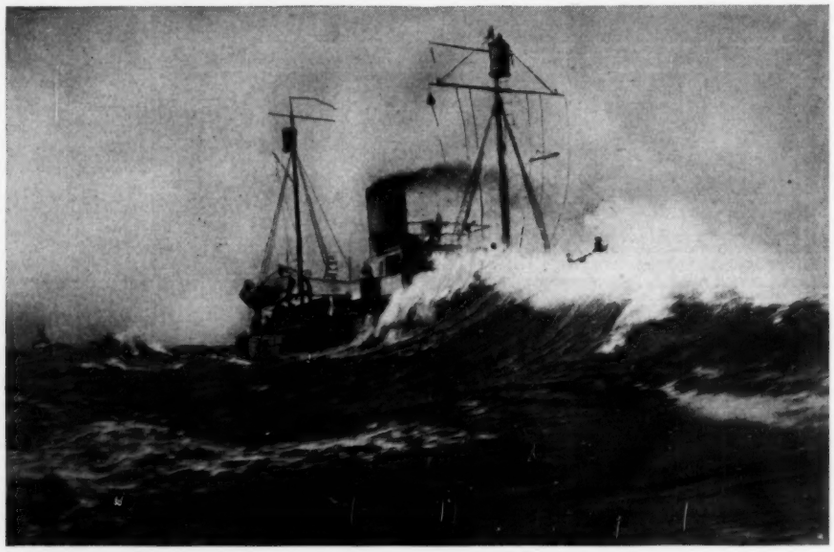
How can he peruse the pages of old Dampier or of Conrad without being eager to experience a typhoon? How can he browse in H. O. and Admiralty Pilots without being intrigued by the names of the shamal, the belat and the papagayo to the point of going in quest of these exotic blasts?

Let us imagine an ardent student of the winds, with both power and sail aboard his craft — the former to get him about quickly, the latter to teach him the true inwardness of every breeze that blows — setting forth in late autumn from an Atlantic port bound for the Mediterranean — where Aeolus himself once had his dwelling. On a great circle course he would skirt the Azores High, getting a preponderance of winds abaft the beam, diversified only by the shifts attending the passage of depressions. Since the latter — the common cyclones that make our middle latitude weather — are no novelty to him, he deviates a little to the southward of this course, and he thus encounters a wide range of possibilities.

There is enough rough weather in the stretch of water just north of the northeast trades to have earned it the old Spanish name of *el golfo de las yeguas* — the mares' sea — "in allusion," says J. K. Laughton, "to its boisterous nature and in contradistinction to *el golfo de las damas*, the ladies' sea, as the trade-wind region was called, from its being so easy to sail over."







The cloud of a line squall at sea

Top, left. Birds taking shelter on board the S. S. "West Quechee" while she was passing through the center of a hurricane on the Gulf of Mexico. The captain reported that the birds were "so thick about the vessel that the second mate went on deck and literally scooped them up by the armful, carrying them into the deckhouse"

Left. Bucking an Atlantic gale. U. S. S. "Winona" enroute from Bermuda to the Azores

On the other hand, here the sailor often finds himself forsaken by all but white-ash breezes. It is a well-worn story that this portion of the North Atlantic obtained its alternative name of "horse latitudes" because sailing ships, becalmed here for days and weeks, jettisoned equine cargoes for lack of drinking water — as plausible an explanation of the name as any other of the three or four that have been suggested. Maury called the whole broken belt of high barometric pressure between the trades and the westerlies of the northern hemisphere the Calms of Cancer, and the corresponding region of the southern hemisphere the Calms of Capricorn.

The course is next laid for Gibraltar Strait. The mountain walls on either side of this historic gateway form a funnel, through which, generally speaking, the wind blows from either west or east. If west, it is the poniente; if east, the more celebrated levanter, which gives advance notice of its coming by spreading a blanket of mist over the Rock. The Pilots tell us that the Strait also occasionally experiences squally winds, called vendavales, that begin from southwest, and pairs of oppositely directed winds, known as contrastes, blowing at the same time within a short distance of each other. The latter are, I suppose, the result of eddies formed by the Rock and the other uplands of this locality.

Among the numerous Mediterranean winds mentioned in nautical literature three are especially renowned — the sirocco, the mistral and the bora. Of these the sirocco (alias scirocco) is not one wind, but several. Almost any warm southerly or southeasterly wind blowing over the Mediterranean and the lands north of it is likely to be described as a sirocco, but while some of the breezes bearing this name are moist and muggy, others are excessively dry.

Siroccos were once said to be warm because they came from the African deserts, an explanation that is more or less true of some of them, but not of all. Wherever these southerly winds blow down a mountain slope they are heated by compression, and if they have lost moisture by precipitation on the opposite slope they become very dry. Winds that have undergone this process are known generically to the meteorologist as foehns. Even on the African coast some siroccos owe their heat in part to the foehn process and are dry winds. They gather moisture in crossing the Mediterranean and bring notoriously sultry weather to its northern shores, but on leeward

slopes — in northern Sicily, for example — the process just mentioned dries them again and intensifies their heat.

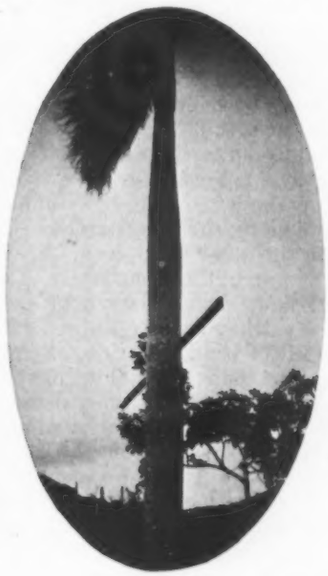
Anywhere between the mouth of the Ebro and the Gulf of Genoa our voyager may run foul of the mistral, but the best place to observe it in all its blustering strength is the Gulf of Lions, where it issues from its favorite habitat, the Rhône valley. Blowing down from the bleak Alpine heights to the warmer shores of the Mediterranean, it feels disagreeably chilly even in midsummer. At its strongest the mistral has been known to blow railway carriages from the track. A weather map will show you the distribution of barometric highs and lows responsible for the genesis of this wind, but it is acceleration under the pull of gravity, as it drains down from the mountainous hinterland, that makes the mistral so violent on the shores of Provence.

Drainage down still steeper slopes makes the bora of the Adriatic an even fiercer blast, on an average, than the mistral. At Trieste, its gusts are said to have sometimes attained a velocity of more than 130 miles an hour. A stiff bora is an ugly customer, especially for sailing craft, for the reason that the Italian shore to leeward has few good harbors. The terrific gusts of this wind whip the choppy seas of the Adriatic into a dense blanket of spindrift, known locally as *fumarea*.

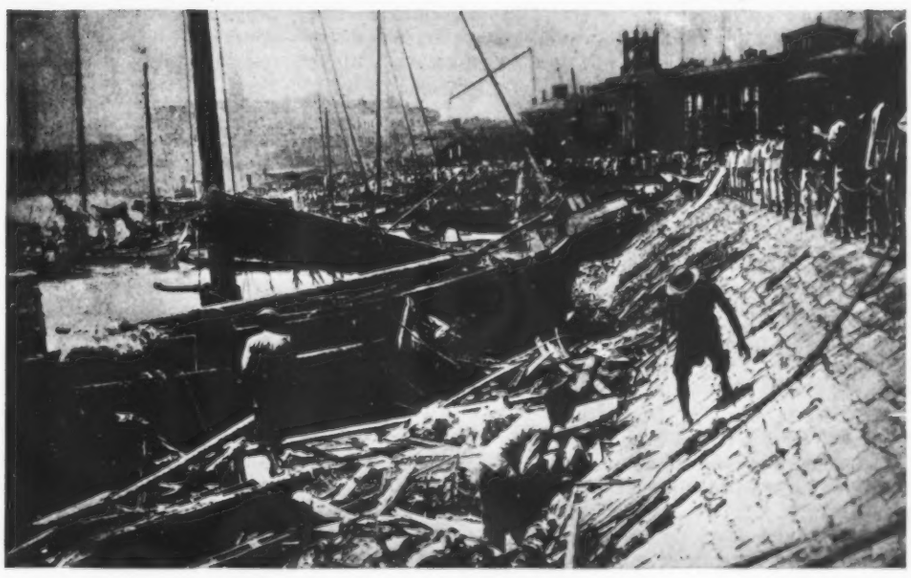
Winter is the season when you are most likely to encounter the "tempestuous wind called Euroclydon," by which the apostle Paul suffered shipwreck on the island of Malta. Today it is called the gregale ("Greek wind") because it blows from the direction of Greece. It has been the cause of many shipwrecks besides that of Paul. In 1810 the British frigate *Lively* was stranded by this wind on the very spot where, according to tradition, the biblical episode occurred.

According to one of the Admiralty Pilots: "The Grecian archipelago is more particularly the scene of those sudden gusts of wind named white squalls, so called from their frequent occurrence under a cloudless sky and their action in causing the sea to assume a white appearance. They are due to the wind rushing down from the high land and striking the water at an angle, when they churn up the sea and cut off the tops of the waves into spray."

Whether or not our pilgrim samples a white squall among the isles of Greece, he is sure to encounter squalls



"The southeaster will be spreading the 'table cloth' over Table Mountain"



Top, right. The feat of a hurricane. Piece of pine siding blown through a royal palm near San Juan in the hurricane of September, 1928. (Photo, Dr. O. L. Fassig)

Right. In the wake of a typhoon. The waterfront at Shanghai after the storm of July, 1915

of all kinds in the course of his world wide travels. How many kinds are there? And what are the distinguishing features of each? By way of attempting to answer these questions, let us ignore, for the moment, the particular itinerary that we have been imagining and consider a cosmopolitan collection of squally breezes.

Meteorologists now recognize two classes of sudden accelerations in the speed of the wind. One of very brief duration, lasting from a second up to, say, half a minute, is called a gust; and the fact that all winds — or, at any rate, all that blow near the earth's surface — are made up of rapidly alternating gusts and lulls is one of the most fruitful of modern meteorological discoveries, the practical applications of which concern aeronauts, engineers, architects, navigators and others. How wind gustiness should be reckoned with in the sailing and designing of yachts is admirably explained in Dr. Manfred Curry's well-known book on yacht racing.

When the wind freshens suddenly, blows hard for a few or several minutes, and then rapidly dies down, the event is called a squall. The causes of squalls are various, and so are their obvious characteristics; hence certain classifications of these winds have come into use, though they are by no means well fixed, even in scientific literature.

Brief local blasts that rush down from mountainous coasts, whether in clear or cloudy weather, are well known in regions of the world far remote from the Mediterranean. Terrific squalls of this character are encountered in the Strait of Magellan, where they were long ago named williwaws (nobody knows why), and today the same name is commonly applied to similar blasts along the mountainous shores of Alaska.

On the other hand, local fair-weather squalls are common enough in regions where there is no high land about to explain them. They have not been so fully investigated as they deserve to be. They often involve little or no shift of wind direction, and are sometimes so limited in extent that two or three of them may be seen whitening the water at one time. Some of them, at least, probably occur when a strong wind blowing above a moderate one acquires such strength that it is temporarily propagated downward to the surface of the water.

The outrush of air in front of an approaching thunder storm is another local variety of squall. It is not common on the high seas, but is experienced off coasts in connection with thunder storms formed over land. Fine examples may be met with off the coast of West Africa, where the thunder storms producing them acquired the name of tornadoes at least two centuries before violent terrestrial whirlwinds were thus denominated in North America and elsewhere.

The line-squall is a squall of great length and little breadth, which advances broadside-on over land and water. It is often hundreds of miles long, but is so narrow that at any particular place its effects are felt but a few minutes, though the total life of the squall may amount to twenty-four hours or more. Besides a sudden brief acceleration of the wind, characteristic of all squalls, the line-squall brings a marked shift of wind direction, a slight rise in the barometer and a decided fall in temperature. Usually, a long, straightish roll of cloud, often very ragged at the lower edge, extending across the sky, is seen advancing and passing overhead, but this characteristic cloud is sometimes obscured by the general cloud masses. The passage of the squall is generally attended by rain, hail or snow, and frequently by thunder and lightning.

Such squalls are due to the wedge-like intrusion of a mass of cold air under a mass of warm air, and they occur mainly, though not exclusively, along the trough of a traveling barometric depression, corresponding, according to the new views of meteorologists, to the "cold front" between polar and equatorial air currents. Some, on the contrary, are not associated with traveling depressions, but are due to a similar encounter of two air currents differing in temperature because they blow from unequally heated areas of land or water. To the former category — those connected with depressions — belong the pamperos of the River Plate region and the southerly bursters of the southeast Australian coast; to the latter, the sumatras of Malacca Strait, which occur when air, cooled by nocturnal radiation, flows down from the mountainous interior of the Malay Peninsula and meets the warm air over the strait.

The nomenclature of squalls is much more extensive than I have thus far indicated, but the numerous names given to them do not imply a corresponding diversity of type. A black squall is any squall attended by dark clouds. An arched squall can hardly be defined otherwise than as a squall in which the squall-cloud or thundercloud, as it rises above the horizon, looks arched, due to perspective. The bull's-eye squall, mentioned by old nautical writers, is a mystery to modern meteorologists. Some descriptions would make it an incompletely developed waterspout; others, a severe thundersquall. Locally named squalls include, besides the williwaw, the pampero, the southerly burster and the sumatra, already referred to, the raggiatura of the west Italian coast, the bayamo of the south Cuban coast, the chubasco of the west Central American coast — and dozens of others. Lastly, many winds of long duration, not classed in their entirety as squalls, are at times decidedly squally.

Our wanderer will hardly find time to hunt up all the outlandishly named breezes that, ever since the days of Admiral Smythe, have been religiously enumerated in the sailing directions for the Mediterranean. Neither, in other long-settled portions of the world, will he care to seek every local example of some widely disseminated type of wind that happens to bear a local name. Hundreds of such names survive today because our forefathers, whose conceptions of atmospheric events were strictly parochial, never thought of comparing the winds of different localities and classifying under a single designation all those having similar characteristics.

The name of the khamsin, as the voyager may remember from schooldays, means "fifty." It is not, as some of the dictionaries would have you believe, so called because it blows continuously for that length of time, but because it is most prevalent during the fifty-day period following the Coptic Easter Monday. Its normal season begins in March, but it occasionally blows in February, and we shall assume that the traveler feels its parching breath off the Egyptian coast so early, and may thus reach the south coast of Arabia before the middle of March, in time to observe the belat. Near shore this violent blast often begins with a dense sandstorm. In the spring he may likewise find the shamal sweeping dust from the Mesopotamian deserts over the Persian Gulf; and April is none too late for the kaus, or sharki, the southeast wind of the same Gulf.

Of course no other wind blowing about the coasts of the Middle East can hold a candle in practical importance and in historic interest to the monsoon. Unlike the trade winds, which have been known to mariners only since the days of Columbus, the monsoon of the Indian seas, which blows part of each year in one direction and part in the opposite direction, has been utilized in sailing

(*Continued on page 94*)

Beken & Son

"Winibelle II," a 36-foot cutter, was sailed single-handed across the Atlantic by the well-known French artist Marin Marie. On the run from Madeira to Martinique she steered herself for 26 days

A Single-Handed Atlantic Passage

Following the Trade Winds on a Passage from the English Channel to New York

By MARIN MARIE

AFTER reading such accounts as those of *Dorade's* crossing of the North Atlantic, or Mr. Weagant's voyage to the Mediterranean on *Carlsark*, one cannot help feeling how difficult it is to measure up to the standard set by these yarns and give new excitement to readers. Anyhow, among American yachtsmen, interest in "short boats for long cruises" is so keen that I feel I have some excuse for accepting the Editor's kind offer and writing, in my turn, of my lonely crossing of the Atlantic from east to west, made last year.

Some people find it surprising that anyone should undertake such extensive cruises, and especially that anyone should do so alone. The question most often put to Captain Slocum was: "Why! all alone! Not even a dog or a cat?" Scores of times I was asked the same question. Concerning the objection to animals on board, Captain Slocum has given his reasons in his book, "Sailing Alone around the World." Every time he took an animal with him some disaster occurred; the goat ate his hat and charts, the cat took to devouring the food, a rat bit him, and the centipede ate the oakum in the seams, and he lived in fear of hydrophobia attacking any dog on board. As for me, the truth is that I was far too much concerned about my water supply to think of sharing it with an animal friend, who would require just as much of it as a human being.

As for being alone, that is a matter of taste and of eagerness for the struggle. In the first place I believe it is good for a marine painter — and I am one — to get in touch with his subject from time to time, to be really face to face with it. This cannot fail to help him to understand the sea and to find pleasure and new ideas in that understanding. Indeed, even when one has had enough of it, one must put up with it — which is a very good thing for body and mind as well as for marine paintings.

But that is beside the point. Sailing boats interest me and I not only like to look at them, but to sail and run them myself. It pleases me immensely to put to the test, in a serious manner, certain conceptions of which I am theoretically sure, and to experiment with others of which I am less sure. It is a question of forming an opinion of my own instead of being satisfied with a ready-made one, or of speculating on hastily formed conclusions. For instance, I was almost convinced that the method of lighting up a sail by means of a searchlight was quite efficacious as a means of preventing collisions.

Marin Marie at the tiller, standing in the hatch-covered cockpit

the Atlantic, having left one's comrade "in the cider," as we say, or having let him die on board for want of proper doctoring. I should prefer not to arrive at all.

Winibelle II was my boat, a 36-foot double-ender, moderately broad and rather deep, so as to allow enough headroom below while permitting of a flush deck. Except for her stern, she was not like the Norwegian type, the "Colin Archers" being rather beamy craft of moderate draft. She was built in Boulogne in a most substantial

At right, the two Vieille lighthouses off Pointe du Raz on the coast of Brittany

I was not nearly so sure that one man would be able to manage a sail with no boom. Then, I wanted to test the appliance for steering automatically dead before the wind; this was an entirely new experiment, and for a long time I had been itching to try it. This in itself would have been a sufficient reason for my attempting a long voyage. And there were many other points in question, such as that of being hove-to under a sea anchor; certain practical details for a watertight foc's'le hatch, an efficient pair of navigation lights, a really serious sort of compass — all manner of things that do not concern one on a short cruise.

Nobody can deny that it is by trying out these ideas and details when all alone that one gets the best notion of their advantages and disadvantages. A rig which has given good results when managed by one lone man is *certainly* efficient. Here is another example: a device which drives a boat dead before the wind for more than a hundred miles a day for 26 days in succession is a device which really *does* work without a crew. In fact, I might easily have had two men with me and found them to be of no use whatever, perhaps even the contrary. We should each of us, in our turn, have steered for two hours because we were sufficiently numerous to do so, whereas I, being alone, was able to sit twiddling my thumbs, so to speak.

As for taking but one other man with me on a long trip, that was unthinkable. Two is *not* a good number. Few people realize the responsibility of the man who is sleeping down below, while the one on deck is on watch alone. I assure you that it is impossible to sleep peacefully for a single minute. Again, two people together take greater risks than will one man; they wait longer before changing jibs or taking in reefs. And, in rough weather, should one of them fall overboard, the other is faced with the terrible responsibility of attempting a rescue. It would be no joke to arrive on the other side of

manner, was copper fastened and sheathed, with lead keel. Inside, she was nicely fitted — all lacquer and mahogany, even in the foc's'le. Originally meant for coastal cruising and an occasional Channel race, she was first fitted with a Marconi rig. When first completed, I thought that with very small alterations about her deck, and with a different rig, that she was of the type and build to stand an ocean cruise, not to mention a 'round the world cruise, which unfortunately, I have no time to undertake at present.

So, after being exhibited at the Nautical Show in Paris last year (she was motored on a truck for hundreds of miles from Boulogne and back, nearly knocking down a bridge on her way, but the bows looked none the worse for that), she had another mast stepped (hollow and very short), another bowsprit made, hatches and cockpit altered, the latter being fitted with a sliding roof to keep out the water, bulwarks heightened, and so on. There were four shrouds on each side, the forestays being double and well apart (you will understand why later on), the bobstay of one piece of steel. All the halliards were led aft to the cockpit, with hand winches to ease single handling.

The English architect Laurent Giles remarked to me, one day, that everything was "ridiculously" strong. To me this seems less ridiculous than to have things giving way every time it blows a breeze. At that moment the architect is seated comfortably in his office — and you are in the soup! It has always been the same old story since yachts were first constructed. No wonder that fishermen hold their sides laughing at yachting craft.

The rig was of a very old style, that of French pilot boats. The mainsail loose-footed; no boom at all. So at least I shan't break any gooseneck. I have had my share of these accidents. Then there were two forestaysails which could be hoisted alternately, a small one and a large one.

I shall be asked why I did not choose, rather, to retain the Bermudian rig. For three very simple reasons. In the first place, I have not had enough experience of the rig, and I am not bent on gaining that particular experience in the middle of the Atlantic. Second, the rigging has to be kept taut if you want it to stand up, and well balanced. On a new boat especially, it is necessary to watch the stretching of wire very closely, which one man cannot do carefully enough at sea. Third, if I have had trouble with booms, I have had none with gaffs, which make it possible to let down the mainsail in five seconds without leaving the helm.

I have come to hate booms and patent reefing. In a calm they are noisy and impose severe chafe and strain on everything aloft. In a gale they are beastly; until you have boom and sail lashed securely on deck, and a trysail rigged, you never feel safe. Then I had to run 3,000 miles in the trades, remember, and alone, with constant danger of jibing. So that wouldn't do. I dropped the boom completely and found that, after all, with a loose-footed mainsail, a boat would haul as close to the wind as any other, surprising as this may seem. And how reliable! Of course, I kept a spare gaff and a spare mainsail. The rig was completed by control of the helm from the interior of the boat and by a special device for steering automatically dead before the wind.

As for the inner accommodations, aft was a separate engine room, with a 10 h.p. full Diesel (side propeller) that gave electric light at the same time, and always worked like a clock, never smoking, never failing to start at the first pull of the handle. Down the hatchway was the galley and my berth, well aft — that always was my plan. Then the cabin, and forward, in the foc's'le, the sails were kept. Water in separate ballasts, hand pumps, etc.

Winibelle had been named for my little daughter. My wife broke the traditional bottle of champagne on the bows, after which, without further ceremony, the boat was thrown head first into the River Liane, at Boulogne.

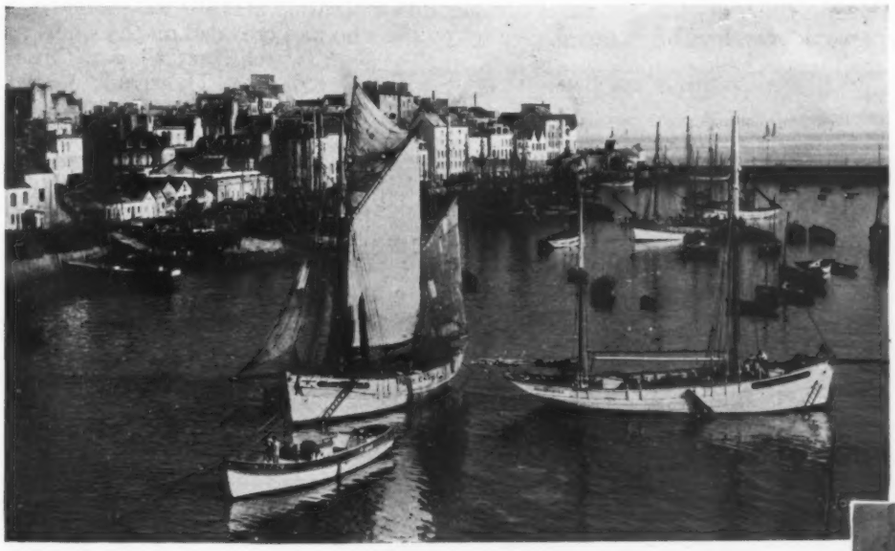
There, in contrast to the tropical winds *Winibelle* was to contend with later on, it was blowing bitterly cold. During the evening a snowstorm broke, which lasted nearly eight days. Eight inches of snow covered the deck, interfering seriously with the work of getting the boat rigged and completed.

Ten days later, however, all was ready for sea. Henri, an experienced seaman who has often gone to sea with me, supervised the fitting out. I meant to keep him until I sailed alone from Brest. When I stepped off the train I found *Winibelle* just about ready to put to sea, her burgee fluttering merrily and everybody working in earnest at the finishing details. The necessary formalities were gone through during the evening, food and provisions were taken aboard, and the boat sailed the following day, March 2nd, shortly before noon. The Director, the draftsman, the mate, the Director of the Nautical School, and my sailor were on board. Within two hours the compass was adjusted in the roads of Boulogne in spite of the choppy sea and the cutting wind which blew from the sou'west.

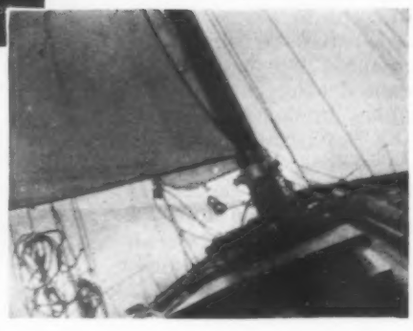
At six o'clock in the evening, when our passengers had returned ashore, Henri and I got under sail and made for the south coast of England, knowing perfectly well that the sails were neither stretched nor even quite properly tried out. But we had to make the best of it, and at any rate, we had nothing to fear as far as the *strength* of the boat was concerned. Ridiculous, said Laurent Giles . . . !

In fact, after having sighted Beachy Head at seven o'clock in the morning, head winds obliged us to tack 'round the cape, and we picked out Nab Tower in Spit Head roads at nine o'clock in the evening in a thick fog. It was exactly midnight when we dropped anchor at Cowes on one of the darkest nights I have ever known. Our stay there lasted fifteen days, and during that time I was very busy changing the blocks and part of the running gear and putting the inside fittings into proper order.

I should have been finding the best way of sailing and handling the boat. Mr. Bruce Atkey of the Island Sailing Club, of which I am a member, had fitted out his boat *Laura II*, for the purpose of enabling us to make trials and comparisons. Unfortunately, we were too pushed



"Winibelle's" port of departure, Douarnenez, from which she sailed May 10th, 1933



Right, a view forward showing the boomless mainsail which proved satisfactory in all respects

for time to take full advantage of this plan. We tried, in vain, to adapt a Hyde or a Kelvin propeller with folding shafts. I was greatly disappointed, for I had always had the idea of a feathering propeller, and the prospect of having to drag a solid one for 6,000 miles did not please me.

The last coating of paint had been applied during a spell of frosty weather and it was peeling off everywhere. We tried to camouflage this leprosy in order to enable Beken to take a photo. But here again we had bad luck; dead calms occurred, and as a result, the picture looked foolish. (Does it not?)

From Cowes *Winibelle* proceeded to Granville by way of the islands of Alderney and Chausey. We crossed the Channel on a bright moonlight night, but once more in a fog which hindered us greatly. It was almost dead calm, so that we felt helpless there in the track of the steamers which came our way by the dozen, hooting madly and rushing from everywhere. If we started the motor we were unable to hear the ships approaching. For the first time I tried the searchlight that I had had fitted up in order to throw the light against the mainsail. But in the fog, I must admit that the light served only to dazzle us. We had no pump fog horn as yet, as I planned to get one from a manufacturer in Granville, and I so soon lost my wind blowing into the tin fog horn that I had to get Henri to relieve me, though he was on watch below.

We entered Port-de-Bray, in Alderney, at nine o'clock in the morning. A depression was announced — the equinox. Just as we were getting under sail next morning we sniffed, if I may say so, beastly weather coming. Squalls from the S.E. were spreading out from the summit of the island and playing on the calm waters of the harbor, the dust of the roads was caught up in whirlwinds, and the barometrical curve, which Henri carefully kept, looked none too good. We dropped a second anchor and kept under shelter, the nose of the boat close to land, waiting to see how matters would develop.

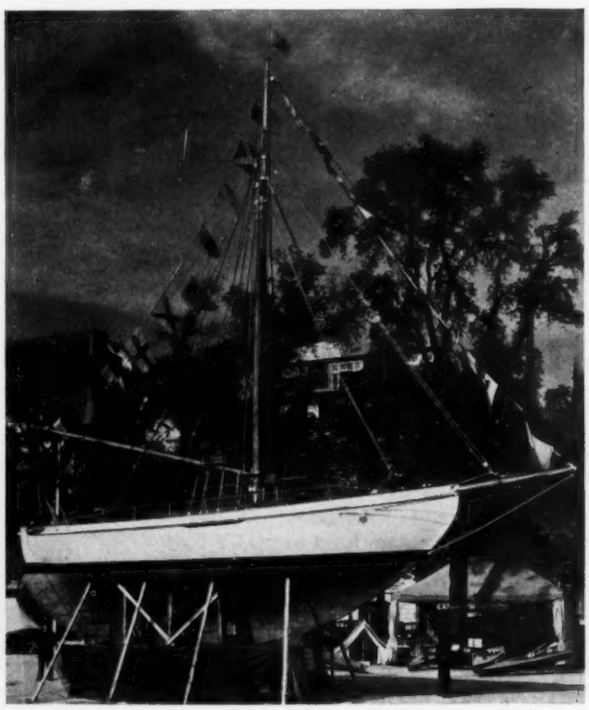
During the night and the following morning it freshened considerably from the S.E. Already it was difficult to keep in communication with the shore by means of the dinghy, which was very small. The storm grew into a gale and we had to keep watch all night in the face of a lashing rain. The boat strained at her moorings. The main cable had been eased at the bitts by manila rope to give better elasticity, and the sail was ready to be hoisted on the lower reefs in case we had to get out.

We foresaw that at any moment we might experience a calm before the famous brisk turn towards the N.W. which is usual in these seas, and, in fact, at about nine in the morning things quieted down for about half an hour so that we were able to get underway and take shelter in the small harbor. There was such a violent swell from the west that the waves were splashing right over the breakwater, though against the wind, and then the spray was hurled several hundred yards out into the sea again. But when the wind turned, it began blowing in the same direction as the swell; the sea would cover the breakwater from end to end, and sometimes one could see nothing of the jetty.

Alderney is the funniest little place I have ever known. Though under the British flag, it is inhabited by Normans of the old breed who speak the Norman-French patois. Some families trace their genealogy back to the year 1150 when the Dukes of Normandy had not yet become kings of England. There are only 1800 inhabitants, and tourists completely ignore the place. Up the hill is the neatest little town in the world, with people who look friendly and contented.

From there we sailed towards the Chausey Islands, only forty miles distant, a nice little place, too, of which my father is part owner and where I have a house. There I left the dinghy and the unnecessary gear. My father hoisted a flag over his house when he saw *Winibelle* coming, for he had been looking for us during the last few days and wanted to cast a critical eye over the boat. And so did the fishermen who had known me as a child and who are always eager to discuss a sail. I am always pleased when I can show them something new, although I must be prepared to carry on interminable arguments about it. They noticed that the boat was slow in coming about, and that confirmed Henri and me in our opinion that we would have to have another mainsail with a longer gaff. They also thought the boat was rather light in her lines: there was not enough ballast, as we had already observed at sea.

My wife had come from Paris to St. Malo, where I met her with the boat. It was there that we had decided to part, although I was to call at Douarnenez before heading out into mid-ocean. I need hardly mention what a painful thing this separation was for us, surrounded as we were by people who had crowded on the wharf to watch *Winibelle* getting underway. Thousands of miles stretched before me in endless prospect, and I knew that I should be several months without sending any news or getting any. My father wished me good luck and himself cast off the ropes.



"Winibelle II" was shipped home and put on display at the Paris Salon Nautique last September

We very soon reached Douarnenez, near Brest, for the boat had been doing seven knots until we rounded Ushant, and here I parted with Henri. I had not told him anything about my plans, so as to avoid unnecessary discussion. While the boat was being fitted out he was surprised to see what unusually close attention I paid to every little detail, and how strong I wanted the gear, ironwork, and spars. Moreover, he was astonished that I should leave my dinghy and a few cabin doors at St. Malo, that I

(*Continued on page 98*)

Generators and Gadgets

Some Notes on Electric Gear and Its Installation

By CHARLES H. HALL

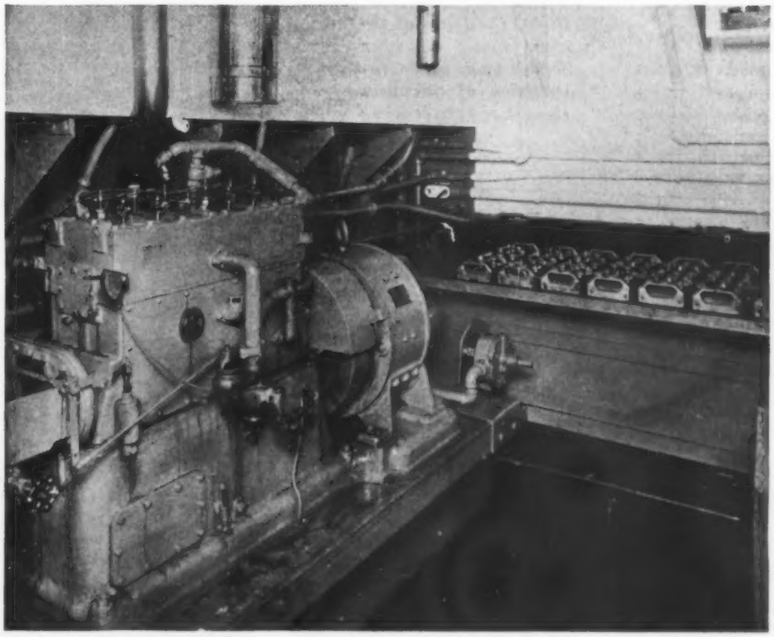
WE HAVE become so accustomed to an uninterrupted supply of electric current in our boats that it is embarrassing to have it fail. On the rare occasions when this happens there is a wild scramble for an electric flash lamp or, if that cannot be found, a candle. When electricity was first introduced on shipboard, some fifty years ago, prudent shipowners supplied oil lamps also, which were kept filled and trimmed. Nowadays the oil lamp is a rarity, except for anchor or running lights, while candles are equally scarce. The modern electric plant functions practically 100 per cent of the time, though wise owners will provide some substitute means of lighting the ship in case the plant or wiring should happen to go wrong.

In the small motor boat, the generator on the engine will take care of about a dozen small lights, but it must be used with judgment so that the storage battery will not be run down when it is wanted for starting the engine. The starting motor takes considerable current; to be sure that the motor will turn the engine over when the starting button is pressed the battery should have nearly a full charge. When much of the time is spent at anchor, there is always the chance that the lights have used too much of the battery capacity so that the engine will not start when asked to. When the boat is underway a good part of the time, as in cruising, the battery is more apt to be kept well charged, though even then care in the use of the lights is indicated. For the very small motor boat, or sailing craft, a six-volt dry battery may be the solution, with small bulbs economically used and efficiently placed about the cabin.

If the boat is large enough to have ten or a dozen lights, including the binnacle and running lights, it is advisable to install a small lighting set. These are self-contained units, with gasoline engine and generator direct-connected and mounted on the same base. Some have spring suspension to minimize vibration. Such a set is easily removed for inspection or repair. The fuel tank is mounted with the set. If piped to the main fuel tank, there should be a shut-off valve in the line. These generating sets are neat, well made and compact, and may be installed in a small space. Do not, however, make the mistake of tucking one away in some half-hidden corner, but place it where it is accessible and yet does not interfere with access to other parts of the machinery. Do not place it low in the engine room, but have it as high as convenient. Any gasoline vapor present will gravitate to the bilge and the lower the generating set is placed, the more chance there is of a sparking brush igniting the explosive mixture in the bottom of the boat. There is always the temptation to put a small, self-contained piece of machinery like a generating set in some hole or corner. It runs so well and with so little attention that one forgets that it may need to be overhauled some day. In one case that I have heard of the generator was mounted between the after ends of twin engines, so that the rods of the clutch controls rubbed against the wiring. To get at the clutch on either main engine, the generator set had to be dismounted. As might have been expected, trouble was the normal condition until the electric set was moved to a more suitable position.

For the larger yacht, there is a greater variety of units available. It may be a single or double cylinder outfit, very carefully balanced, or a multi-cylinder machine with better inherent balance and more uniform torque. If the two-cylinder machine is a two-cycle one, the choice will be difficult. Weight and space occupied may be the deciding factors in selection.

When we come to the still larger craft, we have to choose between a single plant which will provide all the current needed for the windlass, refrigerator, boat hoist, steering engine and heating, as well as lights, including searchlight, or two smaller plants which together will care for the peak load while one alone will have sufficient capacity for ordinary service. Sometimes there is also a small plant, for use when the yacht is laid up, or to supply current for the anchor light and a few standing lights. Probably, in this case, it will be better to install the two sets rather than one large one. The larger set may be slightly more economical in fuel consumption, but the tendency today is to have as much of the auxiliary machinery as possible in duplicate.



A fine example of a rugged, serviceable, and well-laid-out electric generating plant in the "Nirvana." A Winton gasoline engine drives a Westinghouse generator which feeds the bank of Edison batteries placed nearby

For the Diesel-driven vessel, the choice of generating unit will be one or

more of the modern multi-cylinder Diesel sets, using the same fuel as the main engines and avoiding the fire hazard of gasoline. But there are a number of Diesel yachts which do not need as much current as is supplied by the small Diesel generating sets. For a boat of this type, a gasoline unit is indicated, and much care must be taken with its installation. The fuel tank should be placed on deck, not in the engine room, and there should be no outlet below deck from the fuel pipe except to the tank on the set. Often the engineer will want a cock in the line in the engine room so that he may draw a small supply of gasoline for cleaning an oil filter, for instance, or washing his dungarees, without going on deck. This will introduce a fire hazard and should not be permitted. Loose gasoline has no business in the engine room of a Diesel job. The fuel for the motor launches should be kept in a tank on deck so that the boats may have their tanks filled while on the davits or at the boom.

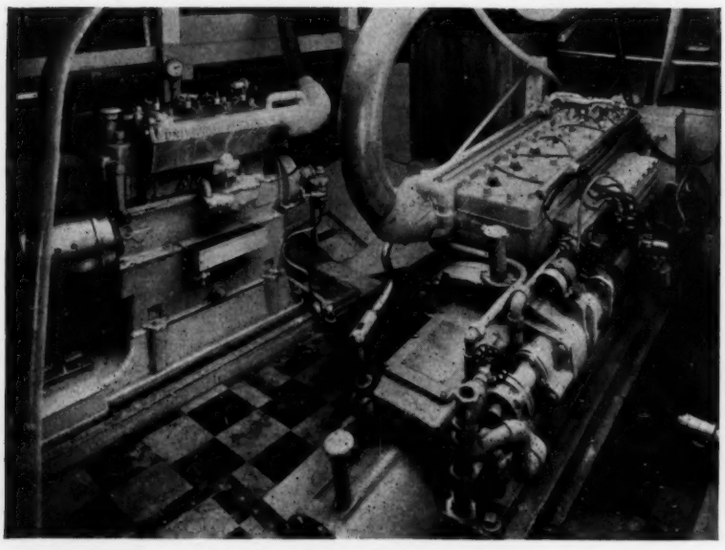
Besides having the generating set installed as high as possible, great care should be taken with its foundation. It should be solidly built and everything possible done to minimize vibration. The set should rest on a good block of oak or teak and should have a tight metal pan under it with the sides carried up to catch any oil or gasoline leakage and prevent its running down into the bilge. In the average yacht, the set cannot be placed high enough to have a drain to the sea, though this is a good thing if it can be arranged. Rubber or springs under the holding down bolts will help to keep down vibration. Openings in the generator casing should be screened with fine mesh wire screens at all times. Then, even if a brush sparks badly, the screen acts as does a miner's lamp and prevents an explosion of any vapor present.

The exhaust line from the engine on the set should be independent. Running it into the line from the main engines results not only in a back pressure on the set but in soot and other unpleasant things being forced into the exhaust line and even into the cylinders of the generator engine. The amount of exhaust gases from the set is usually so small that it may be carried out through the side of the yacht abreast of the engine room without bothering anyone on deck. Thorough muffling is important; there are few things more annoying on an otherwise quiet night than the "bang-bang-bang" of an exhaust from a boat anchored alongside. Besides a good muffler in the exhaust line, it will do no harm to have heavy fittings and a little extra weight so that the hot gases will have a good deal of cast iron to warm up. Where the exhaust goes through the hull, a special fitting should be used to keep the hot pipe from direct contact with the wooden planking. In a number of cases the planking of a boat has been found to be badly charred from a hot exhaust without any sign on the outside. And get the outlet high enough above the water line so that it will not be submerged when the boat rolls. One can ignore a steady "put-put," but is acutely conscious of it when its rhythm is interrupted with a choking gurgle as the exhaust opening goes under water.

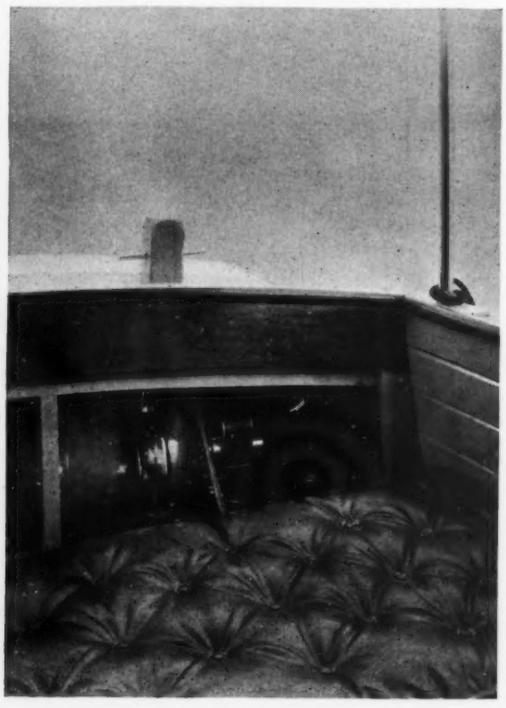
The switchboard should not be placed where there is any chance of water getting to it, or there will be trouble. This seems elementary, but there are installations in which that very thing happens. The switchboard should also be fitted so that it may be removed without much trouble or swung out so that the back of it is accessible. Big yachts have the switchboard placed so that there is room for a man to work behind it, or hinged so that it may be swung out into the engine room. Small boats are the worst offenders, usually having the switchboard in a semi-inaccessible corner and fastened securely in place. If any work has to be done on it, all wires have to be cut and tagged before removing the board, and then spliced after the job is finished. There is seldom enough slack in the wires to allow the board to be moved so that its back is accessible.

Wiring and fittings may seem to be minor matters, but they are really important. The great thing to remember is that, as usual in marine work, what is good enough for a high-class job ashore may not be any good afloat. Wire that is perfectly acceptable for fine buildings may be useless at sea. Dampness and sea air are inveterate enemies of electrical gear, and the best is none too

The Universal generating set in the schooner "Grampus" is a good example of a compact installation alongside the motor



Right. Good use of the space under the after deck is made by the installation of this neat Homelite generating unit



good. Those fancy gadgets that are so nice for the house may be trouble makers aboard the boat. Wiring, for example, should be solid, not stranded. Stranded wire may be a little more flexible than solid, but it does not last as long. Dampness gets into the minute spaces between the tiny wires of a stranded line and starts corrosion that soon eats away the wire. The insulation of wire for marine work should be of new live rubber (at least 30 per cent of it should), not the dead blackish stuff used in the ordinary house job. And to prevent corrosion, every soldered joint should be carefully washed off with alcohol after it is made. Remember how green the soldered joints on the home-made radio used to be after exposure to salt air?

Lead-covered wire looks neat but somehow it does not seem to stand up well afloat, even when run high up in the boat. The salt air affects it and it may deteriorate in a single season. Wiring should be run in conduit, steel below decks and brass where it is exposed to the weather. This steel conduit is light tubing, not pipe, and its weight, with the wire in it, is little more than that of the lead-covered cable. Joints in the conduit are fitted with brass compression rings against which the parts are screwed up tight, making a solid, watertight joint. Above decks, where exposed to the weather, the conduit should be of brass and be fitted with unions with rubber gaskets and rubber packing to insure watertightness. Plugs for intermittent use must have watertight caps which screw down on rubber. Their contacts must be designed to stand the voltage used, remembering the ever-present dampness on a boat. Do not allow any low voltage automobile fittings, but insist on the best marine type. Where there is room behind the bulkhead, these plugs may be flush on the outside, only the screw thread for the cap projecting.

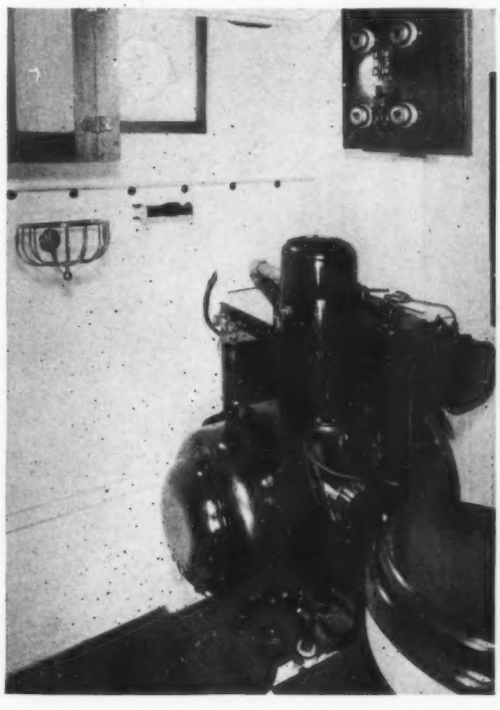
Any lamps on deck, such as running and anchor lights, binnacle lights and so on, must be well-designed and made with good connections and solid wire instead of the prettier silk-covered stranded cord used ashore. Such lights must burn under all conditions, and their wiring should be of the very best. Binnacles, whether of the over- or under-lighted type, should have their lamps in duplicate. Then, if one burns out, the other may be switched on at once. And it will be an extra precaution to have the oil lamps trimmed and filled as a standby. You may never need them, but if you do, you do not want to waste time in searching.

The starting cable on the engine carries considerable current and is of good size, though its insulation is not always as durable as might be desired. It is stiff and is often run so that it bears against the base of the engine. With constant vibration it does not take long to chafe a hole in the insulation and start a short circuit. This wiring is also often laid out in rather a circuitous route from battery to engine; it should be led as straight as practicable to avoid too much voltage drop in the line.

Batteries, of course, must be placed so that they may be easily accessible and their compartments well ventilated so that fumes will be carried off quickly. One installation which may serve as an "awful example" may be mentioned. In this, the generating set was placed in a rather small, tight locker with the battery just below it. Any fumes arising from the battery when it is being charged would rise to the set, and any gasoline fumes due to leakage from the set tank or connections would fall to the battery. All that was needed for a blow-up was a spark. Another case was about as bad. In this boat the vent from the fuel tank was led up inside a door post, terminating a few inches below an electric switch. This was discovered during the course of an overhaul, and the vent pipe was run up to the air. In that position it carried gas fumes outboard — but the smell of those fumes was so annoying to the owner that the vent pipe had to be extended above the awning! Why a spark from the switch had not ignited the gas vapor before the vent was shifted is a mystery. Some of the queer arrangements found when inspecting boats for overhaul are enough to frighten anyone who can recognize a fire hazard when he sees it.

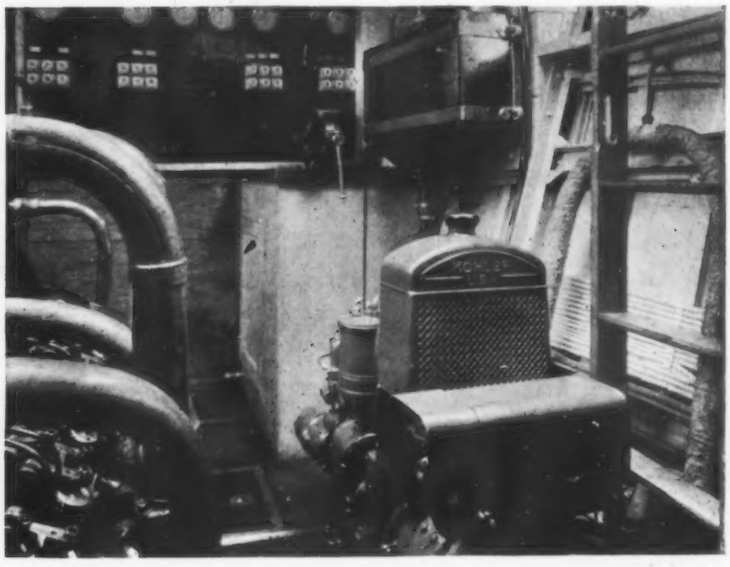
Still, as in everything aboard a boat, the human element is the most important. Designer and builder may

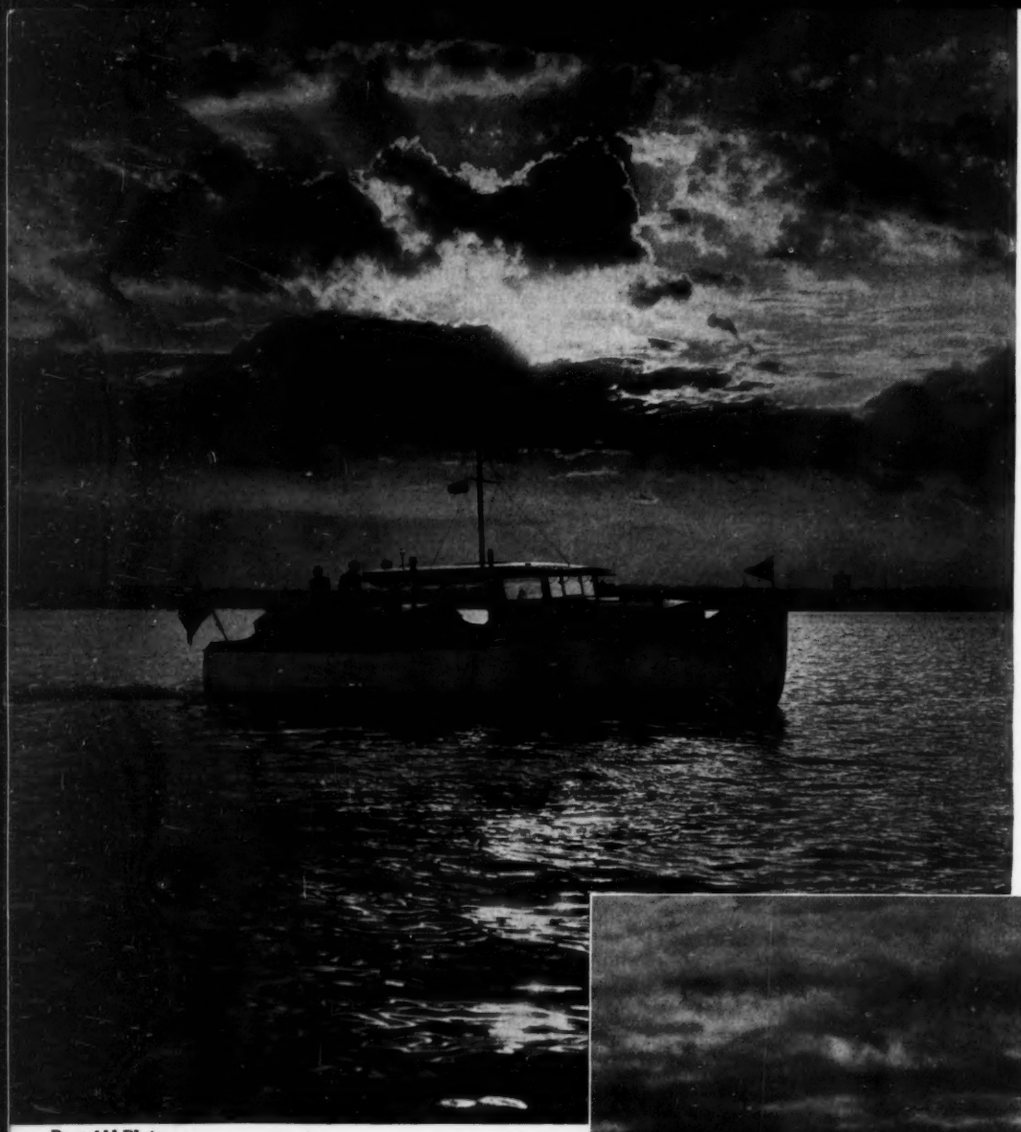
(*Continued on page 92*)



Left. In this installation unused space in the toilet room provides a compartment for a Delco air-cooled set

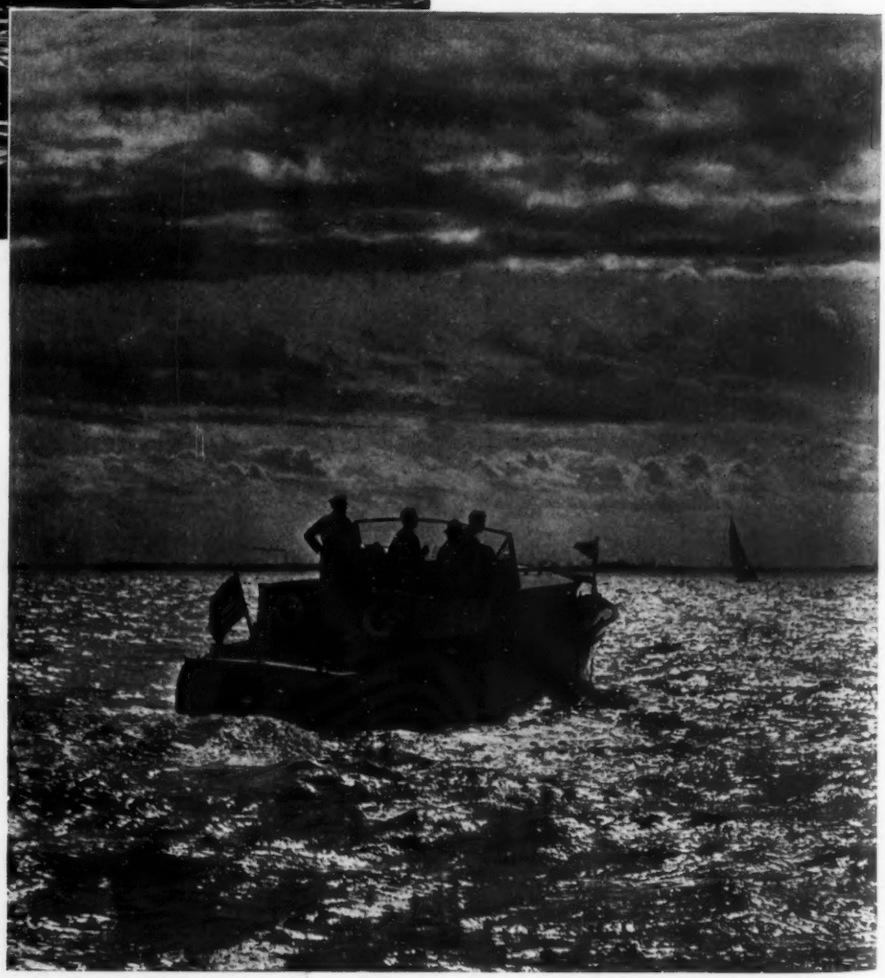
A Kohler generating set, placed alongside the engine and hard by the switchboard, provides ample electricity



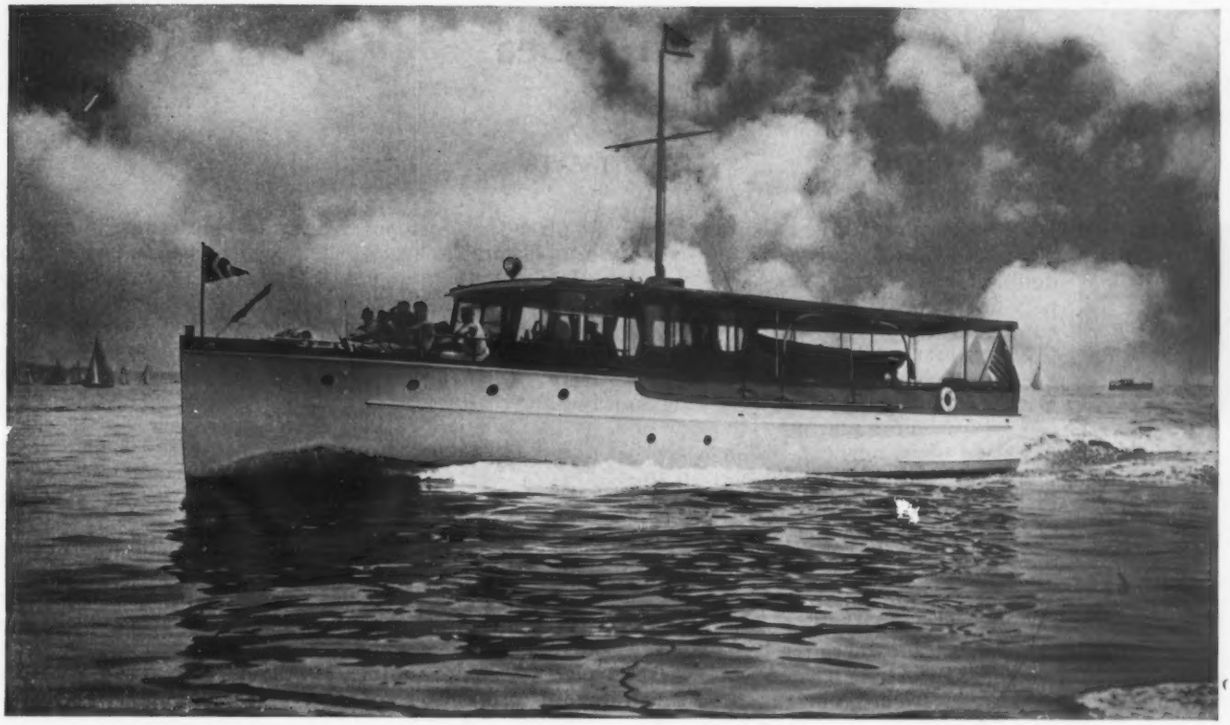


Late afternoon on Long Island Sound. A Matthews 38-foot cruiser, Sterling powered

Rosenfeld Photos

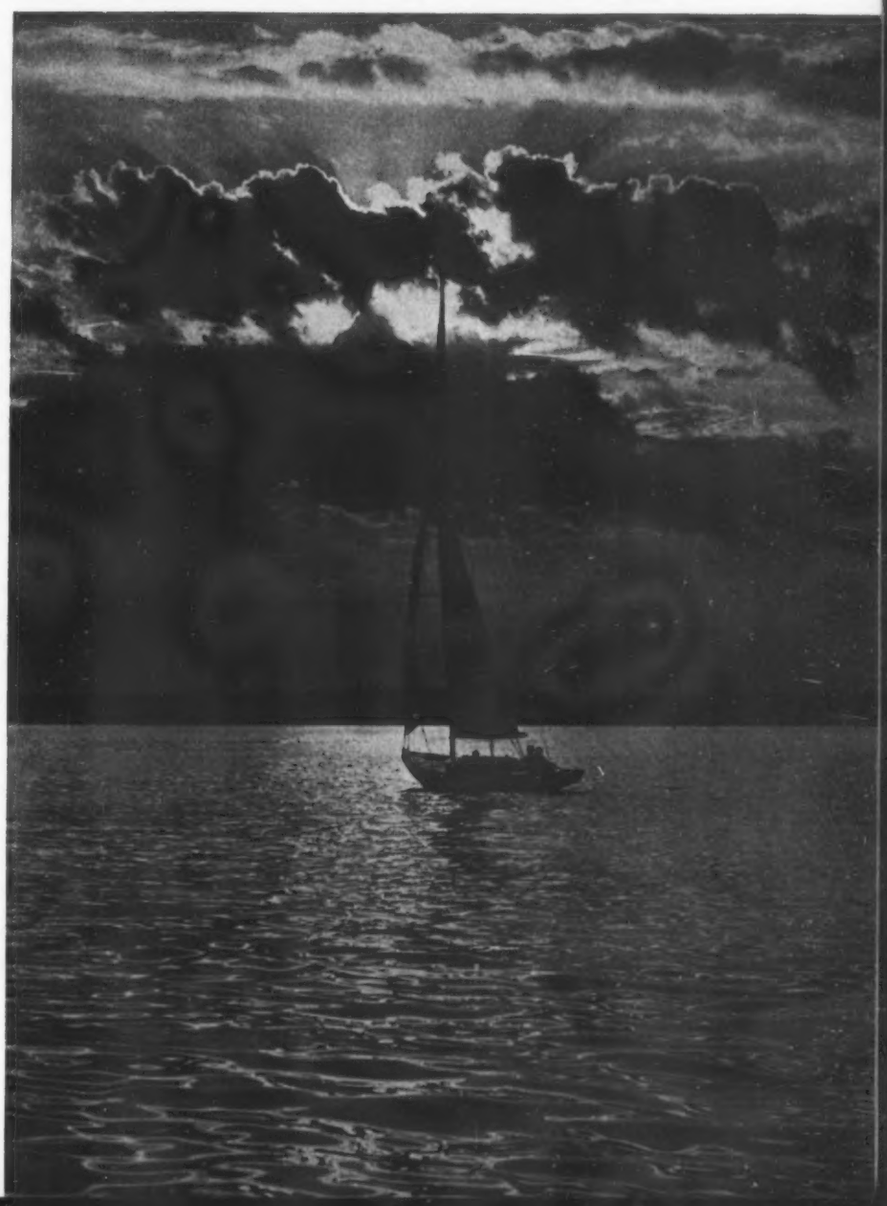


White clouds and a dying breeze. A 39-foot a.c.f. day cruiser with Chrysler motors



Calm and clouds. An Elco twin-screw 57-footer

The Open Road



Making port. Sloop "Anita" ghosting along in light airs

Men at Sea

By

LLOYD MAYER

HE WAS long and lean as the old *Mufti* of the Howling Dervishes who used to double himself over a sword blade and pop hot coals into his mouth for the entertainment of subchaser officers in Constantinople. But his face was not ascetic. The expression was that of a West Indian turtle patiently trying to escape from an aquarium. He came on board for the experience of going deep-sea in a small boat, and we understood vaguely that he was an uncommon factor in big business. As such we respected him.

His name was Herman. Stalking down the wharf beside James Gyle, the navigator, who had a girlish frailty, Herman looked like an amiable chicken hawk chaperoning a fledgeling. Gyle had invited him without the formality of notifying the owner. We had expected there would be six of us — all hardened veterans of offshore cruising. Herman swelled our ranks to seven and was admittedly a novice.

I was in command, so the owner put the matter of shipping Herman up to me.

"You can take it or leave it," he said. "If you think it'll crowd you, tell it to shove off."

I nodded absently. "All right. Thanks."

We were to sail next morning, without the owner, and I promptly forgot about Herman in the remembrance of accustomed anxieties. When in command you are pinned by an ultimate responsibility. You are to blame not only for your own mistakes but for those of your subordinates. You recognize no higher authority, you are omnipotent and friendless as a god. But if you have a conscience you are terribly afraid of the eminence on which you stand alone.

If Herman had crawled aboard on all fours (in which position he would have resembled some quaint dragon out of China's folklore) I doubt if I should have noticed him. All of us were as strange to one another (except for Herman and James Gyle) as a shanghaied crew on a whaler. There was an air of constraint as we gathered in the cabin of the *Gleam* and I gave a rough outline of what I expected of the crew. What they expected of me was of course beside the point — but I would have preferred to listen to that. Criticism can be seen and not heard. As I looked around from face to face I wondered what the expressions of polite attention concealed.

Paul Gray had arrived last — in a sleek automobile. It was twilight by that time. A slender feminine figure accompanied him part way down the wharf and they clung together for a moment. As soon as he came on board, Paul produced a bottle of whiskey and entrusted it to me. I formed an immediate liking for him, not because of this generous gesture but as a result of something else that happened later. The morning we sailed there was a little boy on the wharf who had helped me load stores and who had made himself generally useful. His name was Paul.

"Paul," I said, "take this milk bottle up the street and get a nickel back on it."

Paul Gray leaped up from his seat on the cabin house, stretching out his hand for the bottle. "Sure!"

After that incident I had no doubts on the score of Paul Gray. The rest of the crew had still to prove themselves, but they appeared a likely lot — with the exception of Herman, gaunt, stooping, deferential — and neat, supercilious James Gyle. I knew I could expect nothing from Herman, but I had a right to expect more from Gyle (the ex-merchant marine officer) than his indifference seemed to augur. I could have no misgivings as to his qualifications, but he was arrogantly casual and indolent.

Dick Marston, with his engaging stammer, small blond mustache, thinning hair, impressed me as a dilettante. There was a dependable look about the raw, barrel-chested Pat Kelley, and I felt I could trust Herbert Dane, who had a quiet air of competence.

During the final flurry of activity prior to departure, Herman, in the rôle of looker-on, seemed ubiquitous. Like some great unhappy bird, he perched first in one place, then in another — but inevitably at some focal point of interest, whence it was necessary to eject him. There was so much of him that his uselessness became obtrusive.

We got away at last, under power, watched by the owner and a little group of friends gathered on the pierhead. A nor'west wind blew fair down the blue river that reflected the glare of the July sun. The hatch cover over the lazarette was off, and we had no sooner entered the channel than Dane discovered that water was streaming into the bilge from a joint in the exhaust line. While we debated the advisability of putting back and obtaining a Stillson wrench with which to tighten the joint, I saw Herman peering into the lazarette nervously. He lifted anxious eyes to mine.

"Is that gasoline?"

Already the terrors of a sea voyage in sail had begun for him.

Distasteful as it was to return, I swung the *Gleam* back on the reverse course and we were soon alongside the familiar wharf again, making explanations and repairs. Once more the schooner's bow swung outward into the stream, and again I pressed the owner's hand, assuring him that the next time he saw us we would be in Bermuda.

Below the second drawbridge, with the breakwater at the mouth of the river in sight, we made all plain sail. The engine was still running and the schooner's stern settled low in the water, for she was driving fast. Before long we became aware of a leak in the rudder port. Water was trickling into the cockpit through the scuppers in the wheel box at the level of the deck. Recalling the cynical smile of the owner as he witnessed our second departure, I had not the courage to turn back. The cockpit was, of course, self-bailing, and with the motor shut off the stern rose and the leak stopped automatically. Obviously, it could not endanger us. But how was Herman to realize that? To him it could only mean another minatory portent.

We sailed out into the riant waters of the Sound, with the slow chime of the bell on Long Sand Shoal in our ears. It was light, lazy weather, but we had a fair tide through the Race and the *Gleam* sped effortless as a gull toward the open sea. We set the balloon jib and volumi-

"Herman would lift himself shudderingly"

nous balloon staysail in place of the working jib, forestaysail and foresail. Herman, basking like a lizard in the sun, took a trick at the wheel under the tutelage of Gyle. Marston and Dane volunteered to prepare lunch. As the sun, by observation, appeared to be exactly over the yardarm, I served out a ration of grog to all hands.

After passing the Gull we laid a course for Montauk, and James Gyle undertook superintendence of jibing the balloon foresail. He was making such a complicated maneuver of it that I interrupted to explain that it was necessary only to shift the tack aft around the end of the foreboom and the sheet for'ard around the foremast. I could not fathom what his method was, but tactfully agreed it would accomplish the same result, whereupon he seemed to consider himself vindicated.

"Now that you've explained it," he said, "I see that your way is better."

He was so gracious that I suppose I should have smiled gratefully and responded, "Thank you so much."

At any rate, an argument had been diverted and after that Gyle did not offer to draw upon his wealth of experience in the matter of sailing the *Gleam* — nor did he contribute his services more than a couple of times thereafter when it was a question of all hands on deck. In his capacity of navigator he was entitled to be relieved of watch-standing, but he considered himself absolved, also, from participation in any of the menial tasks that are customarily shared by a crowd who go deep-sea in a small craft without a paid hand to do the dirty work. And, more than that, he demanded service. After the first day at sea he took to his bunk and stayed there, where his meals were served to him by one or another of our amiable crew, all of whom displayed an amazing tolerance of Gyle's disability.

He was "a licensed man" and our navigator. To the average amateur yachtsman, unskilled in celestial navigation, the certified master mariner is as awe-inspiring, as capable of miracles as the conjuror at a children's party. I suppose that is the reason why James Gyle was treated with deference and respect while he idled in his bunk, demanded cocoa at awkward hours during the night watches, complained vaguely of illness that was "more than seasickness." The crew humored him, waited upon him, sympathized with him, loth to believe he was the poor thing he seemed, because they revered what he stood for.

There is an admixture of snobbism in that attitude, of course. Herman was in much the same position, for as long as we conceived him to be the powerful business executive and capitalist we were indulgent of his ignorance and helplessness — secretly flattered by his presence, thrilled vicariously by his glamorous associations. But as soon as we knew the truth about Herman — that he was merely a subordinate in an obscure department instead of the mercantile tycoon that we had been led to suppose him, our tolerance wore thin enough to reveal the shadow of the mockery behind it. Stripped of his prestige, Herman was merely a supernumerary — six and a half feet of lank incapability lying nauseated in a bunk. Someone coined the sobriquet, "Horizontal Herman," and it stuck. He seemed to think his state of health was a matter of vital concern to me, poor fellow, for from time to time he would stagger from his bunk to report to me.

"I think I'm feeling a little better, Captain." It was said with the seriousness of a man fancying himself a bit on the hopeful side of a life and death struggle, and with a childlike trust in the capacity of someone to care. I could have laughed in his face, except that I pitied him. "Captain — I'm feeling a little better!" shouted derisively by one or another of the crew became a sort of shibboleth in the latter days of the passage. There is infinite tragedy in the spectacle of a disoriented landsman confronting for the first time the implacable sea in a small boat. Besides his terror of the circumambient, unfamiliar dangers — the mental anguish induced by the consciousness of peril and ignorance of the means to avoid it — there is the physical torture of seasickness, combined with the discomfort born of the ship's capricious capers, damp bedding, stenches from the drowned galley, the slosh of bilge water, the confused noises of straining timbers and complaining gear.

Prone in his bunk, Horizontal Herman looked like a corpse laid out for burial. It was startling to see him

arise from that death-like immobility and emerge on deck, clad only in a pair of underdrawers — a cadaverous apparition. He would seat himself gingerly in the cockpit, surveying silently the gray desert of the sea with eyes hopeless and reproachful. A gleam of sunlight escaping from the sodden Gulf clouds would illumine that gaunt figure for a moment, then a wave would lick the weather rail, spilling its crest in a foamy flood that emptied inboard through the coaming scuppers in quiet, searching rivulets. Herman would lift himself shudderingly from their clammy embrace and go below, bearing upon his single garment the evidence of his baptism. There seemed to be nothing in common between him and his sponsor, James Gyle, except an inaptitude for the sea. One would have supposed, from the circumstances of Herman's presence on board, that the two men were mutually sympathetic. Yet they appeared utterly indifferent to one another, rarely exchanging a word during the voyage. I was not surprised to learn that Herman had been a prospect of Gyle's when the latter, after his retirement from a career in the merchant service (with "more than a master's papers," as he modestly put it) had been representing an investment house. Possibly, I thought, Gyle has sold Herman a bond that has gone sour, and has taken this means to make it up to him. You simply could not credit a person of Gyle's character with generosity.

Most of us were in the cockpit that first evening at sea when he made a languid exit from the companionway. He had, he said, looked at the chronometer. We looked politely curious.

He shrugged his small shoulders. "There's no use taking any sights for longitude."

"Really? What do you mean?" I asked, refusing to be stunned by this pronouncement.

James Gyle tapped the deck impatiently with a bare foot. "It was never unclamped. He put it aboard without unclamping it. Why, if any officer in my line had ever done a thing like that he'd have been fired!" (The *Gleam's* owner was a retired merchant marine officer and had installed the chronometer himself just before we sailed.)

Gyle's voice rose in protest. "I'll write *him* a letter."

"I wouldn't," I said mildly. "Remember, he's been a very sick man."

"But doing a thing like that is simply inexcusable! You can't place any reliance in that instrument now. It may be any amount out."

I doubted that, for we had had nothing but the smoothest of seas thus far and it was unlikely that even if it had been free to do so the chronometer would have swung in its gimbals. But I did not dispute the point. It was only too evident that James Gyle, navigator, had seized upon this pretext to provide himself with an alibi in advance.

I could be thankful, at least, for the honesty of those other chaps who shouldered the work of the passage uncomplainingly and in a spirit of good fellowship. They were obedient, efficient, uncritical. They shared the tasks of cooking, dish washing, handling sail, steering — even waiting upon Gyle and Horizontal Herman as those two lay inert in their bunks, the one indifferent, the other incapable.

The slow, imperturbable Pat Kelley even essayed the practice of navigation, impervious to the derision which his efforts excited in Gyle. He had brought along his own tables and a chart, and would pore over them diligently for hours. Often he obtained positions which checked closely enough with our D.R. to be reassuring to me, at least, while they may have been the means of goading our navigator into taking the few sights he did. From the beginning to the end of the voyage Kelley established an unbroken record for nudity and naïveté.

He approached me one day with a self-conscious air. "The fellas say I ought to ask you if it's all right for me to go 'round without any clothes on."

I assured him of my complete approval of the custom and he seemed vastly relieved. He was uncertain how long it would be advisable for him to remain in Bermuda after we arrived there, what ship he should take back when he departed. He discussed these questions with everybody at length, and when no one attempted to arrive at decisions for him, he demanded: "Well, who's going to make up my mind for me?"

We had the customary two days or so of dirty weather in the Stream — and the arguments as to the width of the Stream where we crossed it. There was one ominous evening when rain squalls, opaque as mud, flattened out the sluggish, hulking seas, and with the coming of the wind astern the schooner fled on her course, steady as a toy boat on the placid waters of a lake. Only the menace of the sooty wall of clouds building higher, the rising voice of the wind in the rigging, the stinging lash of the deluge, dispelled the illusion of security. Gray, a dripping silhouette at the wheel, fitted perfectly into that somber setting. It was, according to him, wonderful sailing, and when eight bells struck he refused a relief.

Down below, with hatches and ports closed against the rain, the air was surcharged with sickish boat odors — the reek of bilge, of stale food, of sweat. We were on the edge of the hurricane season, keeping an anxious eye on the glass. As I looked at it now, in the glow of a torch, I saw that it was still registering a slow, relentless fall. I clambered into my bunk, which was soggy all along one side where the rain dripped steadily through a series of leaks in the hatch coaming.

In the opposite bunk Gyle stirred, awakened. The thrum of the wind was an overtone in the concert of the elements — the resonant drum beats of the rain on deck, the vast hiss of its union with the sea.

"The glass is still falling," I said.

James Gyle's peevish tenor answered. "It's blowing up a gale. We'll be banging around off here for days."

"We may get a hurricane," I said.

"Well — this ends going to sea for *me*. I'm *through*." He said it with the aggrieved air of a man who has been shamelessly put upon and ill-used. "It simply isn't worth it. This is the last time I ever go to sea."

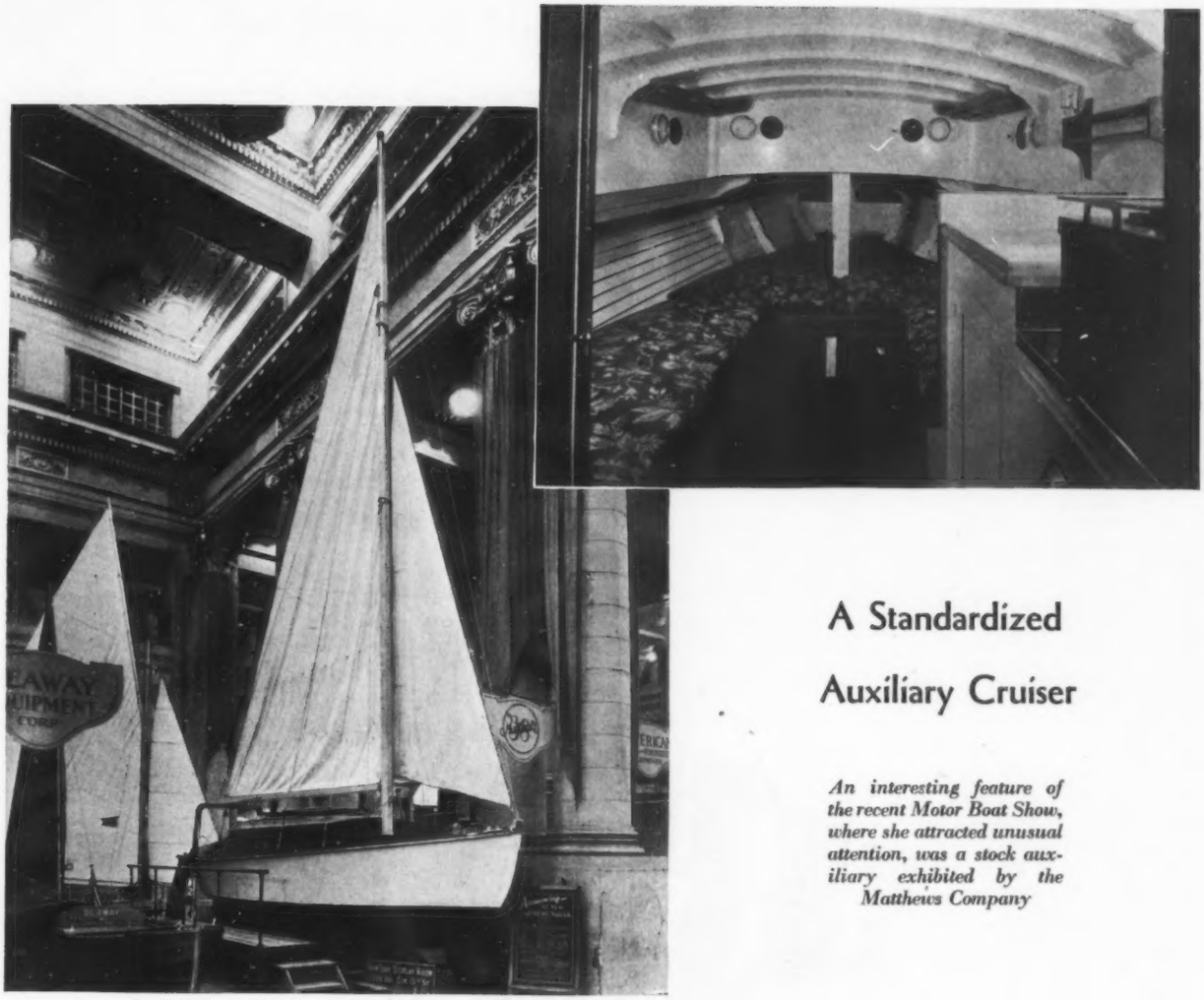
I attempted to offer consolation. "It may be the last time for all of us — if we get a hurricane."

\+ + +

But the *Gleam* sailed out of that dismal night into the pearly morning of another world, and as the splendor of the new day burst across the sea we marked the flight of a lonely tropic bird, dazzling as snow against the hard brilliance of the blue sky. The even, quartering breeze was moderate and we set our light sails. The galley stack belched smoke and the smell of bacon and coffee rose like incense from below, where the indefatigable Herb Dane was deliberately preparing breakfast, assisted conversationally by Dick Marston. Scrambled eggs decked the table like bouquets of goldenrod. In an adjacent bunk Pat Kelley slumbered, innocent of clothes or bedclothes. Opposite lay Horizontal Herman. His eyelids fluttered, he looked at me with a dazed smile.

"I think I'm feeling a little better, Captain."

(*Continued on page 102*)

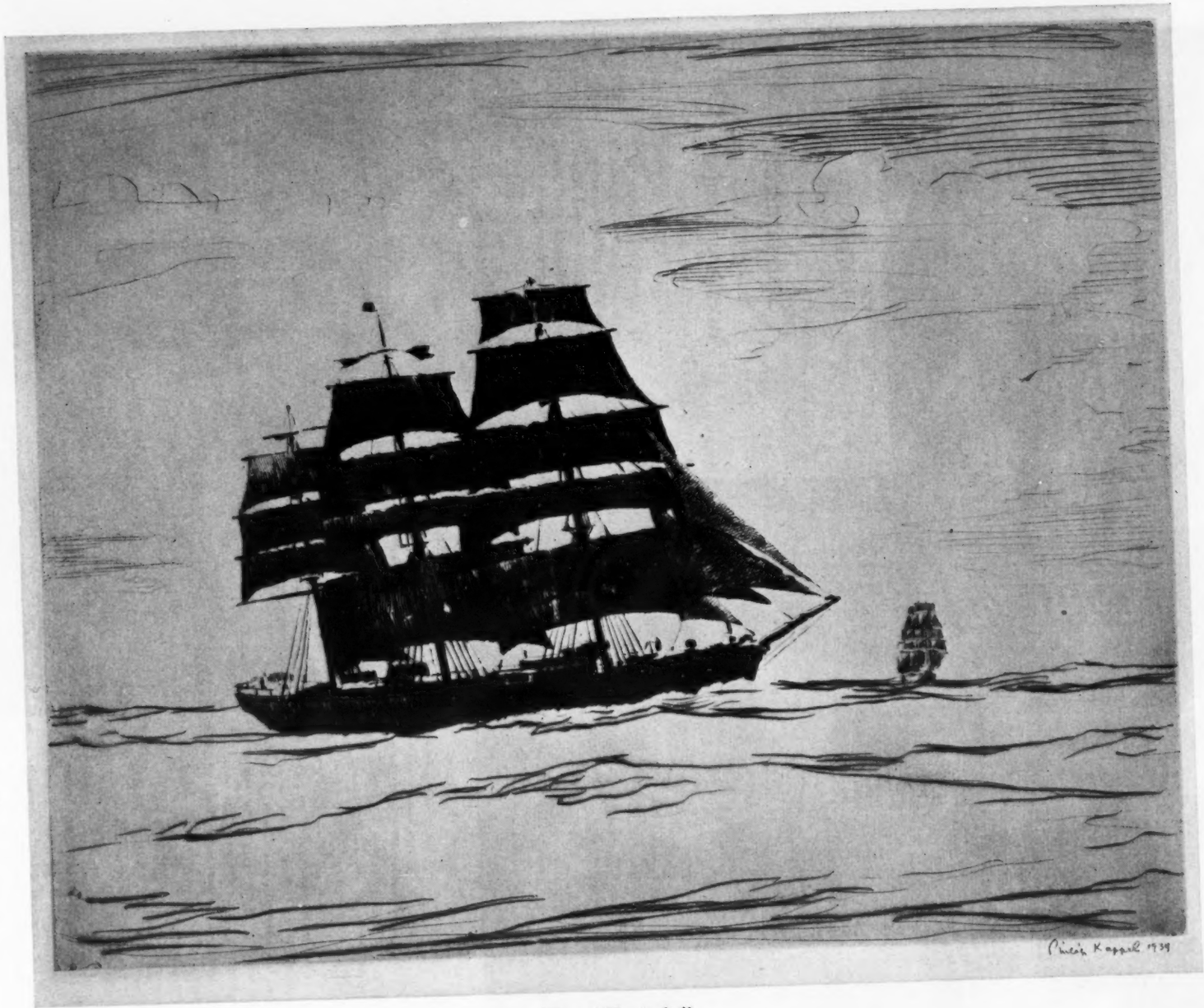


A Standardized Auxiliary Cruiser

An interesting feature of the recent Motor Boat Show, where she attracted unusual attention, was a stock auxiliary exhibited by the Matthews Company

Of the V-bottom, or deadrise type, the new boat was 25 feet 7 inches long over all, 22 feet on the water, with a beam of 8½ feet and draft of 2 feet 8 inches. Although of light draft, she carried no centerboard, the ballast being 1475 lbs., all outside. The sail area, in a jib-headed sloop rig, was 301 square feet. The design of the boat is from the board of William Atkin. With a 10–12 h.p. Gray Sea Scout motor, the speed under power is a good 7 knots. A smaller single cylinder 5–6 h.p. Falcon engine may be installed

As the pictures show, there is an unusual amount of room below deck for so small a boat. Sleeping accommodations for three are provided, with an enclosed toilet room, a well-equipped galley, refrigerator, and plenty of storage space. The interior arrangement shows the careful attention to detail and conservation of space typical of the Matthews power cruiser



The "Tusitala"

From an etching by Philip Kappel

The Effect of Shape on Hull Resistance

A Comparison of Steamship and Sailing Yacht Hull Shapes

By KENNETH S. M. DAVIDSON

A COMPLETE mathematical solution to the problem of the flow of water around a moving hull would provide means for predicting the resistances of any hull without testing its model. There is every reason to believe, however, that it would lead to something far more important, namely the prediction of the best hull for any given set of conditions. For this reason, or perhaps just because they liked the problem for its own sake, many able investigators have devoted themselves to its solution. But it has turned out to be very complex, and extremely stubborn. No solution has been advanced which accounts adequately for the measured resistances of actual hulls, to say nothing of the second objective. It is true that a few basic analytical methods have emerged, and these have contributed to some very pretty qualitative reasoning. Yet most of what is known about hull resistance has been learned through correlated experimental experience.

Even though it failed to provide numerical answers, a mathematical analysis which took account of the important variables, so that it could be used with confidence as a guide to experimental attacks on the problem of reducing resistance, would be well worth its salt. No available analysis is sufficiently complete, even for this purpose, and experimental development proceeds, perforce, by "trial and error," that process of gradual evolution in which each hull departs only slightly from its predecessor, as suggested by experience, intuition, or judgment, unaided by underlying theory. A full realization of the great progress which has been made in the design of many types of hulls, in just this way, must bring with it a lasting admiration for the vision and the patience of those who have brought it about. For it has been a slow job, even with the considerable "speeding up" sometimes effected by the use of models.

There is one aspect of the trial and error process which has always interested me. It seems clear that, carried on by different groups of individuals, working on different types of hulls, it might very easily bring about variations of form between types, unless shape characteristics, *inherently desirable* from the point of view of low resistance, were easily discovered. Certainly a modern steamship hull looks very different from a modern racing yacht hull. Of course, minimum resistance has never been the governing design consideration in either type. Yet, in both cases, it has held a very prominent place among the design considerations for many years. There would be little reason to expect steamships and racing yachts to look alike. But there has been a long-sustained effort to reduce resistances and, if a few inherently desirable shape characteristics were known, it might not seem unreasonable to expect both types to reveal them. I think we may count upon the ingenuity of designers to have found ways of getting them into their designs, to some extent at least. As a matter of fact, far from growing more alike, recent developments (such as the "bulbous" steamship bow for instance) seem rather to have made these two types less similar.

It is sensible to talk about steamship and racing yacht hulls in nearly the same breath because both are "displacement" types, moving in something like the same range of speed-length ratios (a general theory of wave behavior, as well as casual observation, tells us that a high-speed motor boat, or a seaplane float, is a different kind of animal altogether). It seems a natural step to wonder just how their resistances do compare. When we tried to draw a comparison, some two years ago, we could find almost no resistance data on sailing boats. So, as soon as we had discovered how to make reliable tests on small models, we started to collect data. Olin Stephens found us four Six-Metre models and we built or borrowed three or four others. The resistance curve in Fig. 1 on page 49 of the December 1933 issue of YACHTING, developed from the tests of one of these models, is that of a thoroughly modern Six-Metre boat which, for our present purpose, may be considered reasonably representative. It is reproduced in Fig. 3.

Plenty of tests of steamship models are available; I have referred previously to Taylor's "Standard Series" — a group of models covering a wide range of variation in proportions, but derived from the same "parent" form by altering the spacing and sizes of the sections. But the question arises immediately — which of these should be chosen for a sensible comparison of shape with the Six-Metre boat?

To answer this question we must first differentiate clearly between variations of size or proportion, and variations of what I call "shape itself"; that is, what the hull looks like. To eliminate disparity in size, we can imagine a miniature steamship having the same length as the yacht. There would be some justification for reducing the steamship to the same overall length as that of the yacht, but giving it the same waterline length (23 feet in this case) is, I think, rather better. Now we find immediately that such a miniature, of almost any existing steamship, would have less displacement than the yacht — steamships are not ordinarily made as "fat" as sailing boats. This looks bad for our comparison, because steamship model tests indicate that weight is about as important as length in determining resistance. If we "fatten up" the small steamship, simply by making all the sections larger, we will alter its proportions, but not its "shape" (i.e., its "looks"). If we make it enough fatter to give it the same weight as the Six-Metre boat, it will be considerably fuller than any existing steamship, but, because steamship model tests have been extended well beyond the range used in actual construction (and I should like to see the same thing done for yachts), it will not be so far beyond the maximum steamship models in Taylor's "Standard Series" as to preclude fairly safe prediction of its resistances. If, further, we give it the same prismatic coefficient as the yacht, that is, about the same longitudinal distribution of displacement, we will have brought its size and its proportions into general agreement with those of the Six-Metre boat. It will still look like a steamship, however, and we can calculate its resistance fairly accurately, by ordinary methods, from information on Taylor's "Standard Series" models. Its resistance curve has been drawn in Fig. 3, with that of the Six-Metre boat.

Fig. 3 is a direct comparison of the effect of shape. It

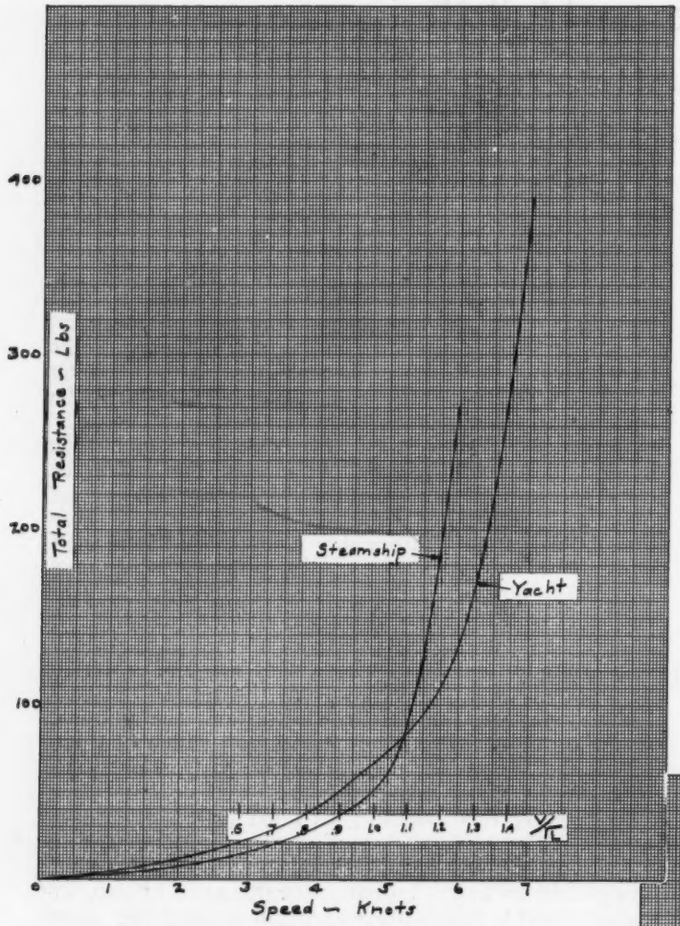


Fig. 3. A comparison of the total model resistances of the "box forms" shown in Fig. 5

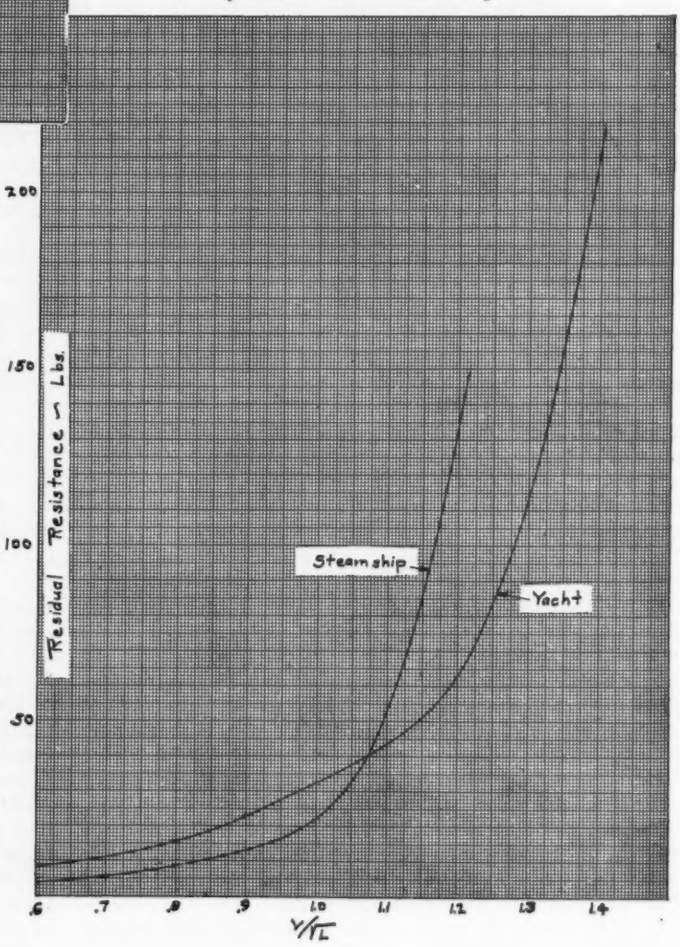
tells us something of the *extent* to which we may expect shape changes, *as such*, to affect resistance. When Fig. 3 was first drawn up, I — for one — was a little surprised at the comparative narrowness of the band marked out by the two curves. Of course, these curves do not cover every possible shape, but they do cover two very highly developed, quite different shapes and, while it is conceivable that there is some other, untried shape which would be found to have very much lower resistances than either of these, it does not seem very probable. It is much more likely that, if a better shape were discovered, its resistance curve would lie only comparatively little below those drawn in Fig. 3. The chances of making a revolutionary improvement in shape itself seem remote. This need not discourage us for, although lying in the same general region, the differences between the two curves in Fig. 3 are very far from unimportant. Let us examine the comparison in more detail.

Fig. 3 shows the total resistances from all sources. There are two main sources, skin friction, caused by the drag of the water past the surface of the hull, and what is variously called dynamic, or residual, resistance, caused by the necessity of pushing water out of the way as the hull approaches and filling it in behind. We have no way of measuring either of these constituents separately, as a towing test gives their combined effect. While there may be differences of opinion as to how accurately the total may be split up, we cannot very well make an intelligent study of resistance without some idea of the relative magnitudes of the two parts. The usual practice is to assume that the skin friction of a hull is equal to that of a plank-on-edge which has the same length and wetted surface, and which moves at the same speed as the hull. The skin friction, so calculated, is then subtracted from the total resistance, and the remainder called residual resistance. Having practically no form fullness, the measured resistances of a plank-on-edge must be, almost entirely, skin friction. In all probability, the skin friction of a hull is never equal to that of the "equivalent" plank. But it cannot be very radically different, and I think we can accomplish our purpose of making a reasonable division for purposes of study and, at the same time, avoid being arbitrary about it if, in subtracting the plank friction from the total hull resistance, we think of the remainder merely as the excess of the hull resistance over that of the equivalent plank, rather than as the excess over the true skin friction of the hull.*

The yacht in Fig. 3 has a good deal more wetted surface than the steamship, due largely to its deep

* An exact division is, in fact, unnecessary to an accurate prediction of full size resistances from measured model resistances. What is necessary is an exact knowledge of the change in skin friction with change in size; this, it so happens, is easier to get.

Fig. 4. A comparison of the residual resistances of the two hulls shown in Fig. 3 above



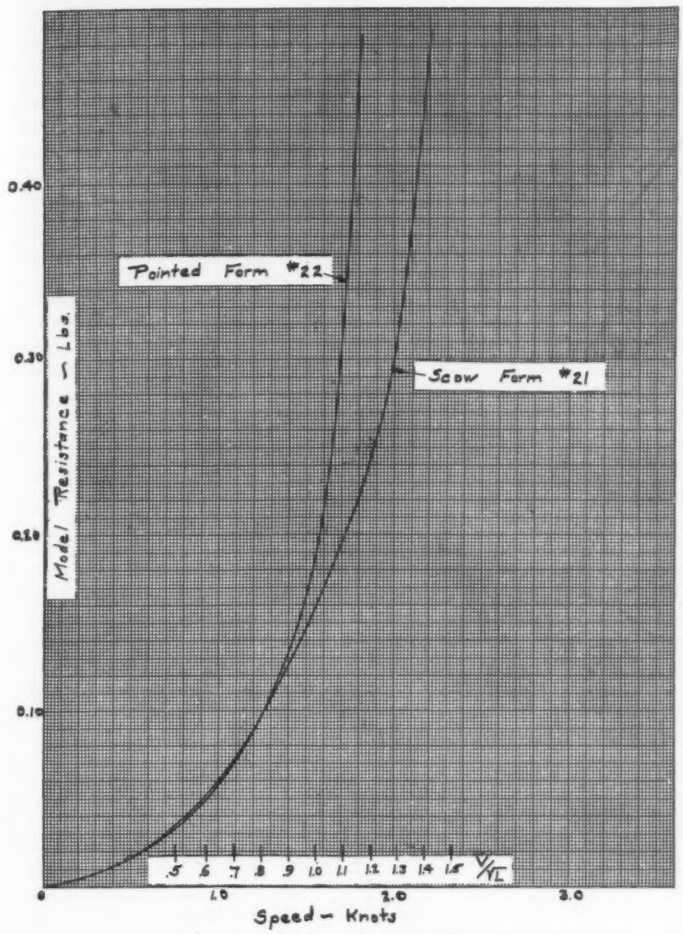


Fig. 6. A comparison of the total model resistances of the "box forms" shown in Fig. 5 below

keel, and higher resistances at low speeds must be expected on this account. Fig. 4 (plotted in a little different way than Fig. 3) shows what is left after subtracting the skin frictions of the equivalent planks from the total resistances of Fig. 3, and discloses the interesting information that the extra wetted surface of the yacht does not entirely account for its higher resistances at low speeds. Further, the plank resistances do not account for all of the measured resistances of either boat. At speed-length ratios in the vicinity of 0.6, any waves which are created are so small as to be scarcely noticeable, and the observed residual resistances in this region cannot very well be attributed to wave-making as such. Careful observation suggests that they arise from failure of the water to close in smoothly around the stern, that is, from essentially the same source as the "form resistance" of an airship. They may as well be called form resistance, as in aerodynamics. They are similar in nature to the eddy resistances sometimes spoken of in steamship work, but that term is usually applied only to abnormal resistances of such things as propeller struts, etc. Form resistance, as I use the term, is caused by the whole hull. Power-driven ships usually have operating speeds higher than those corresponding to a speed-length ratio of 0.6, high enough in fact to make wave-making itself very important. And since, as opposed to yachts, they are usually designed to run at one speed only, form resistance has not, apparently, received very much emphasis.

There is no such thing as a normal speed for sailing yachts; they must be designed, in so far as it is possible, for low resistance at all speeds up to the maximum. At a speed-length ratio of 0.6, the form resistance of the yacht in Fig. 3 is roughly half as large as the skin friction of the equivalent plank, and it is clearly an important part of the total resistance. Its importance is doubly emphasized if we think of speed for a given resistance, rather than of resistance for a given speed. The latter is the appropriate point of view for power-driven ships, but for sailing yachts, with sail area more or less fixed by the rating rules, we are concerned rather with maximum speed for a given driving force (which will overcome a given resistance). Referring to Fig. 3, we see that, at low speeds, a small reduction in resistance will cause a relatively large increase in the speed reached with a constant driving force. Therefore, anything which can be done to reduce low-speed resistances is decidedly worth doing. Reducing the wetted surface is one obvious way to attack the problem, but it looks as if it would be difficult to accomplish much more in that direction than has already been accomplished without sacrificing stability or lateral plane. How much can be accomplished in the way of reducing form resistance remains to be seen. Tests already made at the Stevens Tank indicate that important reductions are not impossible. The subject will bear further investigation. The supposed similarity to the form resistances of airships and airplane parts gives certain clues to possible means of reducing the form resistances of surface hulls, but the necessity for considering any shape change in relation to its effect on wave-making at high speeds complicates matters.

It is, of course, wave-making resistance which causes the sharp upturn in the curves of residual resistance (Fig. 4) at higher speeds. Waves become noticeable as soon as the speed-length ratio exceeds 0.6 by very much and they increase rapidly in size with further increases of speed. That a gradual increase in wave size, resulting in a gradual increase in wave-making resistance, is not the whole story is obvious from the shape of the curves in Fig. 4. The sudden

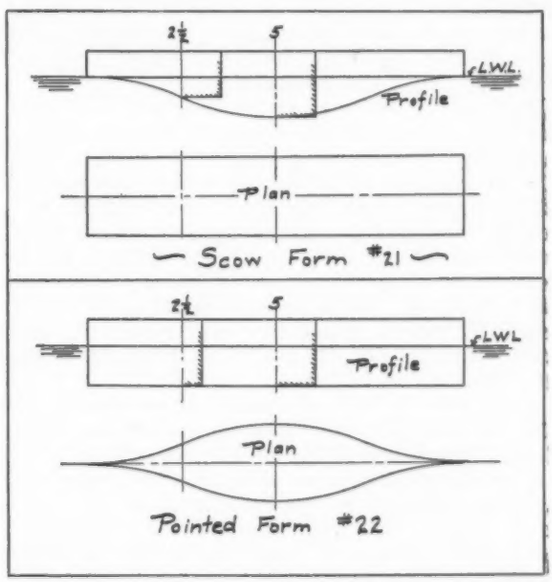


Fig. 5. Two "box form" models having the same length, weight, wetted surface, midsection, and curve of areas

development of the sharp rise at high speeds is particularly marked in the case of the steamship.

It is easy to see how waves are created. In pushing water out of the way at the bow, pressures are increased and the water surface is forced upward; in "pulling" water into the hole which the stern has left, pressures are reduced and the surface is depressed, or rather would be depressed if this second action took place in undisturbed water, as does the first. But the water which takes part in the second action is the same water which has already taken part in the first action, and has been started oscillating in characteristic wave motion. Now it has been shown many times that this motion is very nearly that predicted by the trochoidal wave theory — one of the basic analytical methods to which I have previously alluded. The theory states that, quite apart from their height, the ratio between the speed of advance of ordinary waves and the square root of the wave-length (the distance from one crest to the next, measured in the direction of travel) is constant. The most casual observation tells us that the speed of advance of the waves created by a boat is always equal to the boat speed, that is, the waves move along with the boat in an unchanging pattern. Thus the wave-length must become greater as the boat speed increases. If the boat speed, V, has a particular value, making the wave-length just right, the second crest of the train of waves started by the bow will pour itself into the hole left by the stern, and the reduced pressures aft, tending to hold back, will be eased. The result is the comparatively low wave-making resistances just below the sharp rise in the curves of Fig. 4.

If now the boat speed be somewhat increased, the wave-length will become greater and the second crest of the bow train will not only occur too far aft to dump itself properly into the natural stern hollow, but the latter may be augmented because the surface is already too low. The result is greater reduction of pressure aft, and wave-making resistances which increase rapidly with speed.

There is a tremendous difference between the yacht and the steamship in the way these high resistances build up. Compared with the steamship, the yacht shape has succeeded in delaying the sharp rise until a much higher speed has been reached. This is due very largely to the after overhang — a beautiful characteristic of the yacht shape, from a technical point of view, and certainly an outstanding development. Completely out of action at moderate speeds, so that wetted surface is reduced to a minimum when this is so vitally important, the overhang comes into play only at high speeds, when the added wetted surface is an insignificant disadvantage compared with the tremendous gains brought about by building up forward-directed pressures against its sloping under surface. It is that peculiarity of the sailing yacht problem, the necessity for getting the lowest possible resistances over a wide range of speeds, which has emphasized the extended after overhang and made it so definite a characteristic of the sailing yacht shape.

Now I see no way to escape the conclusion that the effectiveness of the after overhang is not entirely its own doing. If the bow had not already set up a train of waves, the quarter wave would not be as large as it is. So any reduction in the magnitude of the bow wave must tend to reduce the effectiveness of the after overhang and perhaps increase resistances at very high speeds. But it is an obvious fact that, in the usual summer weather, a sailing boat spends much the larger part of her time under sail at moderate speeds — somewhere around $V \div \sqrt{L} = 0.8 - 1.2$. In this range of speeds the after overhang does not seem to play a very big part, and a reduction in the magnitude of the bow wave ought to reduce resistances. The effect, then, of any shape alteration which affects the size of the bow wave cannot be said to be beneficial or harmful in so many words — the range of speeds which it affects must also be stated. If, as in power-driven ships, one speed is under consideration, the desirability of particular alterations is easily decided upon, but in sailing yachts this is not so easy.

There are various ways of affecting the size of the bow wave. We once built, and tested at the Stevens Tank, the pair of box forms shown in Fig. 5. They had the same lengths and displacements, very nearly the same wetted surfaces, and exactly the same "curves of areas." In general, I rather mistrust "trick" forms of this sort — they are so different from actual boats — and I would hesitate to mention the tests of these two, were it not for their very striking characteristics. The curves of total model resistance are compared in Fig. 6, which is impressive enough. But it is nothing like as impressive as the differences in appearance of the two wave formations, especially of the bow waves, at any speed-length ratio greater than about 0.8. The pointed form (#22) makes so much bigger waves than the scow form (#21) that, in comparison, those of the latter seem quite insignificant. Of course, the scow form would plane if the speed were carried high enough, but at speed-length ratios of 1.4 to 1.5, there is only a slight change of trim.

Someone, in looking at these forms, once suggested that the scow form was really an extreme yacht and the pointed form an extreme steamship. In the sense that the sides of a steamship bow are nearly vertical at the waterline, while those of a yacht bow are inclined and, therefore, more nearly horizontal, the suggested analogy is not unreasonable. To justify it experimentally, however, we should have to find a smaller bow wave for the yacht in Fig. 4 than for the steamship, at a speed-length ratio of, say, 1.0. The yacht has a much greater residual resistance at this speed, but that is by no means convincing evidence that the bow wave is greater. At a speed-length ratio of 0.6, where the form resistance could be measured directly, it was found to be high. It cannot very well have completely disappeared by the time a speed-length ratio of 1.0 is reached. The addition of wave-making resistance prevents a direct measurement of form resistance at the latter speed, and there is little reason to suppose, offhand, that the presence of the waves does not affect the eddying wake — after all, both come from the same basic source, displacement of water for the passage of the hull. Yet there are several pieces of experimental evidence, as well as two observed facts, (a) that the width of the eddying wake does not change much with changes of speed and, (b) that the wake seems to go merrily on its way without much regard to waves, which suggest strongly that form resistance behaves in a fairly consistent fashion at all speeds, and that it does not lose its identity when the waves become large. Whatever the truth of the matter, it is very interesting to find that, if we assume form and wave-making resistances completely separable, for the sake of argument, and subtract from the residual resistances values for form resistance at a speed-length ratio of 1.0, calculated from their experimentally determined values at low speeds, the yacht in Fig. 4 appears to have less wave-making resistance than the steamship.

I should like to avoid creating the impression that I

(Continued on page 88)

A "hot" outboard race in 1923. The amazing development of the outboard industry in the past ten years is strikingly apparent when one contrasts this picture with those of present day racers

Twenty-Five Years of Outboard Development

By

HERBERT L. STONE

BETWEEN the time when first we were informed by the optimistic maker of an outboard motor that we could use a rowboat without back-breaking work at the oars, and the present, when 50 to 60 miles an hour are possible with a portable motor hung over the stern of a boat, a quarter of a century has elapsed. These years have seen a development that even the designers and builders of those early motors, jocularly referred to as "egg beaters," would not have believed possible. And yet, today, we accept these little "prime movers" of small craft without a thought of the growing pains which marked the long course of their development, just as we accept the aeroplane flying overhead without the thrill and wonder with which we viewed the early flights of these "flying machines."

This is so because of the very success which the outboard has now attained — the vital part which it plays in the boating activity of the country. In every phase of life upon the water the outboard now has its assured place. As this year marks the twenty-fifth anniversary of the first successful commercialization of the outboard, an examination of the course of its development may prove interesting and, perhaps, profitable, in reaching a realization of what those twenty-five years have done for the boatman.

The whole development of the outboard motor, from those first crude models to the present finished, high-powered little engines, is closely associated with the name of Ole Evinrude. He it was who designed and produced the first commercially successful outboard for boat use. He, first of all, saw the great possibility of this type of power, although even his vision failed to realize the lengths to which the development of the motor would go. He gave his name to the first motors he turned out and there was a time when the name "Evinrude" was almost synonymous with any motor hung over the stern of a boat. Back in 1911, I owned my first outboard motor on Long Island Sound. It created great interest and much excitement; and wherever it was seen it was referred to as "one of them Evinrudes," before even the maker's name was known.

No single individual has contributed as much to the successful development of the portable outboard motor as the big, quiet, shy, Norwegian-born mechanic of Milwaukee, the city where most of Evinrude's life work has been carried on.

There were, of course, portable motors for various uses before the outboard engine came along. Ole Evinrude was making some of these for the U. S. Government back in 1901, in the early days of the gas engine. The advent of the motorcycle also played its part in the conception of the outboard for boat use. As early as 1907, the Waterman Company was making and advertising a portable engine for boat use called the Porto Motor. It differed from the present outboards, however, in that its single cylinder was vertical instead of horizontal, with an open gear box beneath it, and the gasoline tank fastened to the tiller. However, it worked, although it never created much enthusiasm on the part of boatmen. The attitude of the public toward it may best be appreciated by taking account of the early advertisements of its makers, which read, "Don't be afraid of it." Other engine makers also tried their hands at a portable motor, but apparently they saw no future for it.

It was in 1909 that Ole Evinrude brought out his first motor. He had been thinking about the possibilities of the internal combustion engine for small boat propulsion for some time. It is said that the idea came to him on a hot summer day in 1906. He was on a picnic at a small Wisconsin lake when one of the girls of the party (she was

One of the first outboard motors, an Evinrude of the vintage of 1909

The first tilt-up attachment was applied to the Evinrude motors in 1916

The first Evinrude twin, built in 1915 to 1916

later to become his wife and his partner in the company they subsequently organized) suggested that ice cream would be most acceptable. Ole launched the rowboat and started the two-mile pull to the nearest village to get it. The sun was hot, the row long, and Ole's mechanical mind turned to the idea of some means of using mechanical power for the propulsion of rowboats. What he had seen in motorcycle development (in which he had had a hand) told him it could be done. And what a boon it would prove to the small boat user — the fisherman, cottager, camper — if it worked.

During the next two years, off and on, he worked on the design of such an engine, and the ultimate result was the first Evinrude motor. It was a single-cylinder affair, developing a trifle over one horsepower at 800 r.p.m. High revolutions were still in the future. But it weighed only about sixty pounds, and could be clamped on and lifted off the stern of a boat. It was portable. As a measure of what has been accomplished since that first clumsy and rather ungainly motor which would, perhaps, drive a small rowboat five miles an hour, we need only look at a single-cylinder engine today, which develops 2.2 horsepower with only .4 of the piston area of the old motor, runs at 3500 r.p.m., and weighs only 29 pounds. This gives some idea of the way in which size and weight have been pruned down.

On this matter of engine speed alone we have progressed to unbelievable heights. Modern racing engines operate as high as 5500 r.p.m., and in actual competition the drivers of racing outboards frequently turn them up not less than 7000 revolutions.

In the matter of horsepower development, an interesting case is that of the Class C motor which was first introduced by Evinrude in 1927. This motor rated at about 8 horsepower which was soon increased to 16, then 18, then 21 actual certified brake horsepower. In other words, in motors of the same size, the increase was from a possible 6 actual horsepower to today's figure of 21.1 N.O.A. certified horsepower at 4000 r.p.m.

In speaking recently of the development of the outboard, at first somewhat slow, Mr. Evinrude, in a reminiscent mood, said:

"From 1909 to 1920 all outboard motors had only a single cylinder. They served tens of thousands of American outdoorsmen faithfully and found their way into commercial fishing and other industrial uses, first in Norway and Sweden and then gradually throughout the rest of the world. Many of these old-time 'kickers' are still in daily service.

"I think I can say that when I perfected the first twin-cylinder outboard boat motor in 1921, it marked a turning point in the industry. The addition of another cylinder added very little weight but increased the power materially. More than that, it made possible much higher engine speeds, and gave power we originally would not have believed possible. Perhaps it would be interesting to review outboard speeds, just briefly.

"The 'single-lunger' never did much over five miles an hour. The first twin-cylinder almost doubled that in 1921 with a speed of over 9 miles an hour, and that was quite a sensation, and that's when outboard motor races, of which there are thousands every year now, really began. That motor developed about five horsepower.

"The next year the horsepower went up to about seven, and the maximum speed was about eleven miles per hour. In 1925, a speed record of 28 miles per hour was set. Outboards were really beginning to 'wind,' we thought then.

"By 1928, I had perfected a four-cylinder outboard motor. It was an innovation for only a very short time for outboard racing had become a very popular sport and this four-cylinder motor developing over 25 horsepower was the means of setting higher speeds. Race drivers and others who knew the enjoyable thrill of driving a fast boat, gobbled up all we could make and the speed record of over 41 miles per hour was set that year by a young man, Eldon Travis, of Peoria."

In spite of the fact that the early outboard motors were received by the boating fraternity with a certain degree of scepticism, the value of a small power plant that could be attached to a boat and detached at will was apparent. But public confidence had to be built up. With this end in view, the company which Ole Evinrude and his wife started in 1909 offered to send out motors on a trial basis. "Keep it for ten days and if you aren't satisfied, send it back at our expense and get your money returned." None came back. Mrs. Evinrude was the business head of the organization — and a good one. Ole disliked business — he was the designer, the builder, the producer, and stayed

clear of the selling and business side of the venture. My first letters from the firm, back in 1910, were all signed "B. Evinrude." Mrs. Evinrude would not then use her name, Bessie, because of the prejudice many men had against doing business with a woman. But she made the business a success, she made it grow. She knew the value of advertising that "pulled." When the first outboards were placed on the market she headed the advertisements: "Don't Row. Throw the Oars Away. Use an Evinrude Motor." And people read — and did.

The success of the outboard brought other engine builders into the production of this new type of small boat motor, and these builders, also, have contributed to the development of the type — from the simple beginnings of the outboard to the highly finished, powerful product of today. A two-cylinder motor was brought out by Koban in 1914. The Lockwood Ash Company was making its contribution in refinement and elimination of weight, and in 1922 the Johnson Motor Company entered the field.

To make a chronological list of the most important step-by-step developments of the outboard engine in the last twenty-five years, one would have to enumerate the following:

1909 First single-cylinder Evinrude motor. 1.2 h.p.
1913 Horsepower increased 50 per cent and a larger 3½ h.p. motor introduced for commercial purposes.
First underwater exhaust.
1914 Use of magneto ignition.
Koban introduces 2-cylinder motor.
1915 Automatic reverse perfected.
1916 Evinrude builds first 4-cycle outboard.
1919 A year of large production, and several new manufacturers in field.
1921 Full use of aluminum alloys and first Elto light weight.
1922 Johnson Motor Company enters field. First official outboard race.
1925 Racing organized on large scale with several competitive makes of motor.
1926 Hydroplane racing, and first Class C racing motor.
1928 First Elto 4-cylinder, and other large runabout motors.
1929 Introduction of gearless rotary valve by Johnson.
1930 Electric starting introduced, and rubber mountings.
1932 First light single by Caille.
1933 Speed of 61 m.p.h. attained.
1934 Introduction of hoods by Outboard Motors Corporation to house working parts.

Much of this development is the work of Ole Evinrude, who, ever since he conceived the idea for his first outboard engine back in 1906, has devoted his life to the improvement of the type and the enlarging of its sphere of usefulness. For not only has he a gift for engineering, but he knows and loves boats as well. At the age of sixteen he surreptitiously built himself an 18-foot sailboat, after his father, unsympathetic to his son's truck with such "toys," had broken up a previous attempt for firewood. And with what he was able to earn with this boat he was able to pay for his machinist's education at Madison. The internal combustion engine was new then. Its possibilities fired the imagination of the young man. He tells the story himself of the first gasolene motor he ever built, when he was twenty-three years old. At that time he was living at a boarding house in Milwaukee kept by a Mrs. Doyle. When completed, late one night, the young machinist could not wait for daylight to try it out with gasolene. Gas was then still being used for illuminating purposes. Seeing a gas jet, a bright idea seized him. Hooking up his motor to the gas jet by means of a tube, he started the machine. With a cough and a bang it went off, and simultaneously every light in the house went out. His engine went so fast it sucked all the gas from the pipes, and an irate landlady served notice on him to move, then and there.

But this experience did not curb his experiments. He next built a horseless carriage which worked, after a fashion, but he turned his attention to marine motors rather than to automobile development. In 1902 he made and sold several gasolene engines to the Herreshoffs for use in tenders. It was a start, but just a start. He still had to find himself. This he did when he married. With his wife's help he organized the Evinrude Motor Company

(*Continued on page 106*)

The Elto twin outboard motor was introduced in 1921

Ole Evinrude, right, with F. T. Irgens, Chief Engineer of Outboard Motors Corporation, examining the first single-cylinder built by the inventor twenty-five years ago

A compact light weight Fisherman model of 1934

Why Glorify the Rule-Breaker?

By

GEORGE W. ELDER

WHY is it that so many people, and many yachtsmen among them — more especially those of the rocking chair variety — feel as they do about the racing rules, protests, and disqualifications? It would seem almost as if they looked upon the racing rules as a mere conglomeration of meaningless words, open to any sort of interpretation, and never to be taken too seriously. They frown upon protests and frown upon disqualifications. The popular conception of a well-behaved race committee is one that discards the rule book, considers only the personal issues and irrelevant circumstances, and then renders a decision that offends no one and preserves peace at any price. Of course, the decision must include a gentle but firm rebuke to the misguided skipper who, in a weak moment, was so unethical as to file the protest and start all the trouble.

In the January issue there appeared an article by F. W. Conant, entitled "To Protest or Not to Protest." The other side of the question is discussed in the accompanying article by Mr. Elder, President of the International Star Class Association. [Eds.]

Nor is the public often disappointed. When a foul occurs, the race committee turns its official head and hopes against hope that no one will report it. It discourages protesting, and seeks far-fetched excuses to avoid the necessity of having to disqualify. The soft-hearted, compromise decision is the rule rather than the exception. It has become as difficult to get a disqualification on an obvious and proven infringement of the racing rules as it once was to get a conviction on a violation of the Eighteenth Amendment. Why? Because race committees, like juries, are human, and fear criticism.

Still more incomprehensible is the absurd and childish attitude of the protested or disqualified skipper. Instead of taking it gracefully, as do those who are penalized in other sports, your racing skipper seems to think that he has been insulted. The person who filed the protest is a liar. The whole thing is a plot. He attends the hearing with blood in his eye and all the bitterness of one taken to court on a false criminal charge. More often than not, the affair develops into a lasting feud, which spreads to the friends and the clubs of the parties involved.

Scarcely an article is written about a yacht race, in the course of which a foul occurred, in which the author fails to inject his personal opinion regarding the justice or injustice of the accusation and decision. Possibly because the word "foul" might imply "dirty" sailing, he states, and with emphasis, that the foul was unintentional. He points out that no one benefited or was harmed. Then he usually suggests, since the incident was of a trivial and technical nature, that the committee close its eyes to the affair. The result is that the offender is hailed as a long suffering hero; the person who protested is placed in the light of being a sea lawyer and a poor sport, and the eventual winner, the skipper who sailed a clean series and observed the rules, has his triumph marred by many insinuations about winning on a technicality and at the expense of another's misfortune. Is it any wonder, therefore, that the public, which does not understand the racing rules or their purpose, gains a false impression and that public sentiment favors the rule breaker?

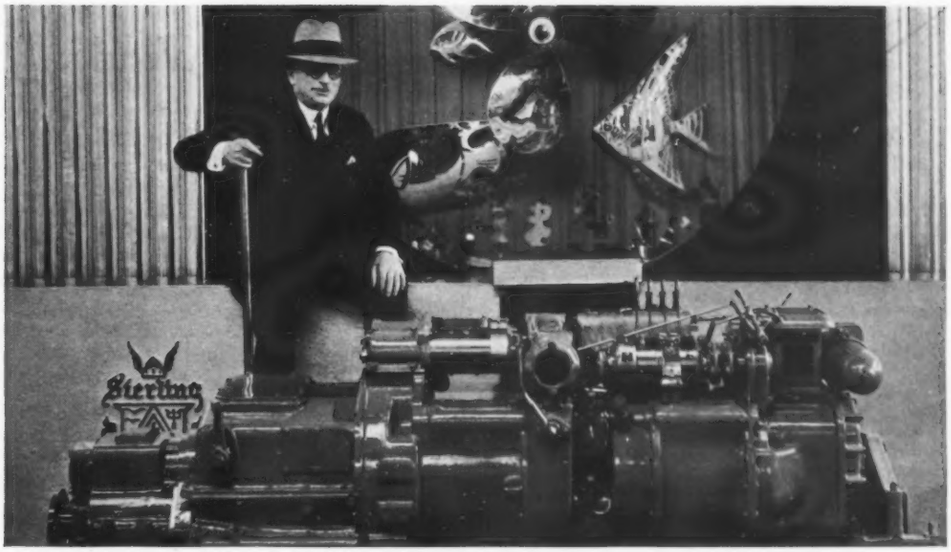
No such condition as this exists in any other field of sport. If Babe Ruth knocks the ball into the stands, just an inch on the wrong side of the foul line, it's a foul, and that is all there is to it. The press does not state that the Yankees lost on a technicality, nor does any one suggest that the umpire should have let the play stand as a home run, because it was so close and because it was not intended to be a foul ball. If a football player calls the attention of the official to the fact that the receiver of a forward pass has been interfered with, no one brands him as a poor sport, nor does the penalized team consider that it has been insulted or disgraced. In all other fields of sport, the necessity of enforcing all rules is recognized, and the decisions of officials are respected and accepted without question by the contestants, the public, and the gentlemen of the press. But not so in yacht racing.

This situation plays right into the hands of the careless or ruthless skipper. He can definitely depend upon the reluctance of others to protest and, even if one should do so, he knows that the odds are all in his favor and that the chances of being disqualified are almost *nil*. What people do not realize is that a skipper who takes chances, who barges the line, crosses yachts that he has no right to cross, and forces his way in at marks, gains a decided advantage. Especially where numerous small yachts are competing, he can, by such tactics, accumulate many additional points during a series, as against the careful, rule-abiding skipper. How unfair and what a handicap this is to the latter, the real sportsman, the man who drops out if he thinks he has fouled, and who received no other mention for it than to have "withdrawn" added after his name in the tabulated results. Think also of the temptation to the young skipper, taught to obey the rules, who sees minor violations going on all the time and nothing being done about it.

In every sport on the calendar — yacht racing excepted — there are officials who oversee that sport, whose business it is to see that the rules are enforced, and that penalties are imposed when the rules are broken. The contestants are under constant supervision by umpires, referees, linesmen, and so on. But not so in yacht racing. The contestants usually are far removed from the observation of the race committee. Therefore, yacht racing rules require that every contestant be an umpire, referee or linesman whenever the occasion demands. In other words, enforcement of the rules is strictly up to the contestants. If this fact could only be driven home to contestants, rocking chair yachtsmen, yachting writers and the general public, enforcement of the rules would soon become a simple and easy matter. Clean sailing would be upheld. Protesting yachtsmen would no longer be criticized — rather, they would be admired. Rule-breakers would learn quickly that they must learn the rules, and abide by them, or be considered a nuisance and a hindrance to the square-shooting, rule-abiding skippers.

The racing rules are not complicated, and the idea that there are many little obscure rules that anyone is apt to violate unknowingly is absurd. The great

(Continued on page 90)



The new Sterling crankless Diesel engine is amazingly compact, low, and light of weight per horsepower output. It is the result of years of experimental development and practical tests

Sterling's Crankless Diesel

A CRANKLESS Diesel engine, built horizontally and so reduced in weight and size as to permit cleaner hull designs and cheaper operation of marine craft, made its first appearance at the twenty-ninth annual National Motor Boat Show last January.

Announcement of the new engine was not made until the eve of the show when Charles A. Criqui, President of the Sterling Engine Company of Buffalo, N. Y., disclosed that his company had been experimenting with one new Diesel for twenty months and had had models under test since last June.

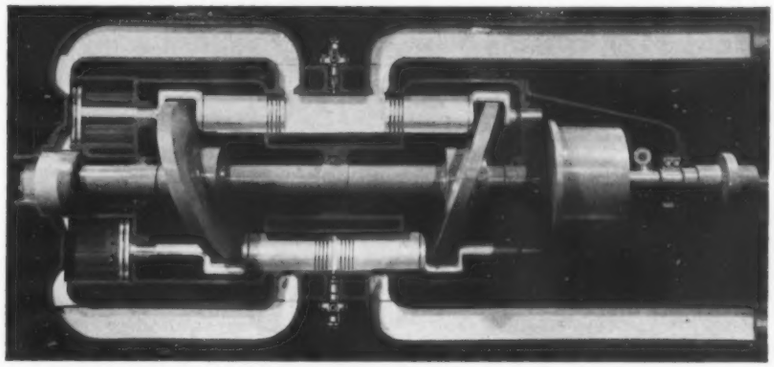
The unusually compact construction of the engine, which is obtained in part through the unprecedented absence of crankshafts, camshafts, cylinder heads, valves and cylinder head gaskets, makes the power plant ideal for marine uses. The engine will run on the lowest grade of fuel oil.

Three of these engines were on view in the Sterling exhibit at the show. One model is a direct drive unit with a nominal rating of 125 horsepower at 1,750 revolutions, and equipped with a Sterling clutch and reverse gear. The second model is built with a reduction gear, incorporating the same type of 3 to 1 ratio reduction gear used on the regular Sterling Petrel engines. The third is mounted on a flat bed plate and is directly connected to a General Electric generator having an output of 80 kilowatts at 1,750 r.p.m. This is probably the smallest power unit of its capacity on the market and was designed primarily for generating electricity on shipboard and for use in stationary electric plants.

Weight per horsepower of the new Diesel ranges from 13 to 20 pounds, depending upon the size of the power unit. This reduction in weight and size, coupled with power and economy, makes the engine particularly adaptable for yacht installation.

The engine will be built by Sterling under a license from A. G. M. Michell, who has developed thrust bearings for ocean liners. The new Diesels include either four or six horizontal cylinders, each containing two opposed reciprocating pistons, making the motor equivalent to a 4-cycle power plant of the eight- or twelve-cylinder type because the Sterling engine operates on the 2-cycle principle. The power generated by the pistons is transferred to inclined discs, which are virtually flywheels, mounted on a straight drive shaft at each end of the engine. The mechanical bearing units, which transfer the power or thrust from the reciprocating pistons to the rotating discs, involve exactly the same principle as that employed in the Michell or Kingsbury thrust bearings, used for propeller thrust bearings on most of the big liners. These bearings, which have a universal mounting, are free to adapt themselves to the inclined disc-flywheels.

Combustion is obtained by compressing the air between the heads of each pair of opposed pistons; at the point of maximum pressure an injection of fuel is made and ignited by the heat of compression.



A diagrammatic layout of the crankless Diesel, illustrating the action of the opposed pistons against the helical flywheels

Taking Advantage of a Shift of Wind

By

H. A. CALAHAN

LIKE every other yachtsman in the world, I have lost many races because the other fellow got the breaks. But when the race is over, and the crew has held the last post mortem, and you're sitting with your bed-time cigarette, you get to wondering why it is that the other fellow is always in a position to get the benefit from a shift of wind, and whether there isn't something that he did, and you did not do, that turned the tide and brought him across the line first.

In such a mood, I sat one evening with drawing board, dividers, and pencil, and sketched out some race situations that were fresh in my mind. Before I got through, I had gone completely geometrical. I sat up half the night shifting cardboard models, measuring dotted lines, writing down impressive-looking gibberish like "AB−CD=O." Along toward morning, I staggered off to bed, dizzy with some amazing conclusions. I had learned that if one boat on the wind is directly behind another and the wind shifts four points aft, the trailing boat instantly finds herself on even terms with the leading boat, no matter if she were five lengths or five miles astern before the shift. (There is one exception to this rule. It does not apply if, after the shift, the trailing boat can lay the mark.) I learned that the one position which nearly every racing man avoids — a berth dead to leeward of a leading boat — is the only position in which a yacht gains on any shift of wind. There were other things as well — enough to make me worry when I considered my years of racing in which I had never exactly realized what had been happening in those abrupt changes of fortune we call "breaks."

For months thereafter I became the yacht club bore. I drew diagrams on the backs of hundreds of envelopes, and when they were used up, shamelessly resorted to the tablecloths. I had to test the ideas on the acknowledged experts. And I learned some astounding things about the knowledge of racing men. The real top-notchers, the men who had names to conjure with, knew what I was talking about. The alacrity with which they agreed showed that I was on the right track. But there were dozens of first-class racing men to whom my dope was either news or nonsense. That made me feel better. One old-timer who has made yachting history answered me, in part, as follows: "Yes, I know that. I learned it in Larchmont Race Week in 1912. I thought there were only five men on the Sound who knew it, but now I see there are six."

So at the risk of being pedantic and mathematical, I am going to reproduce my diagrams and cases and draw some conclusions therefrom. I have confined my cases to situations in which the competing yachts are on the wind.

If we were to take a line four times the height of a yacht's mast and describe a circle with the line as a radius and the heel of the mast as a center, we would have the "zone of interference" of that yacht. Any other yacht, sailing into that zone of interference, either interferes with her or is interfered with by her. Within that zone of interference, the principal consideration must be given to blanketing, back-winding, broken water, and the relative positions of the two yachts concerned.

Outside that zone of interference, the power of boats to interfere with one another is almost negligible, and the skipper's attention may be turned to wind, current, and other matters beyond the control of any of the competing yachts. For the most part, yachts sail in the zone of interference of other yachts for a relatively small part of any race. For the rest of the time, they may seek their opportunities without consideration of interference. Thus, in beating to windward, within the zone of interference, the worst possible place to be is directly to leeward of another yacht. But, outside that zone, it can be proved that a yacht directly to leeward of another yacht gains on any shift of wind. Therefore, in the cases to be cited, let us assume that the yachts are outside of all zones of interference — too far away from one another to be involved in what are commonly known as "racing tactics."

Most racing yachts will go about in eight points — in

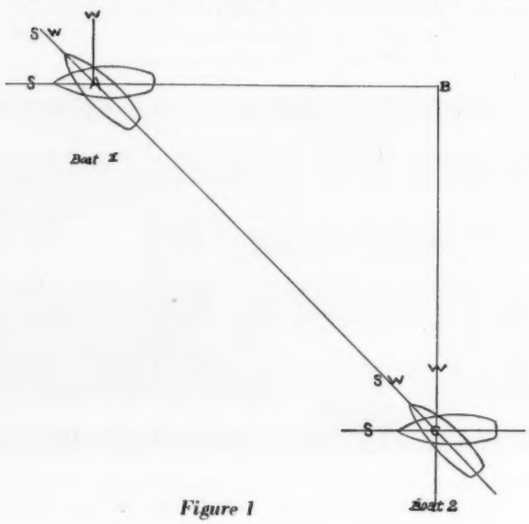


Figure 1

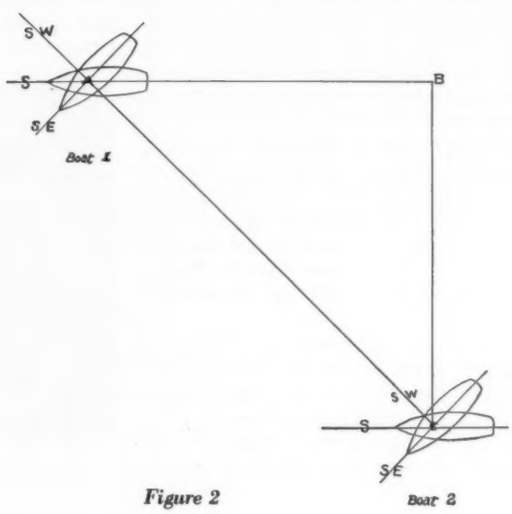


Figure 2

other words, can head up four points from the wind. I realize that this matter is controversial, and that every proud racing skipper will maintain that his particular ship will do better than that. But I am talking not about courses sailed, but about courses made good — and made good without pinching or killing headway. There is a difference in pointing ability; but the difference lies not so much in being able to look high as in being able to maintain speed while looking high. The *Enterprise* was famous for her ability to out-point the finest aggregation of fast yachts ever built; yet in his book, "Enterprise," Commodore Vanderbilt describes going about in a full seven and a half points and having to pinch to lay the mark.

We "kid" ourselves a great deal in the matter of pointing. Yet nearly every racing man waits until the mark comes abeam before tacking for it — pretty good evidence that in his heart of hearts he knows he can make good only four points from the wind.

But let us avoid controversy by excepting the high-pointers and direct our attention to the average boat. It will simplify the mathematics. Eight points, then, to go about. Each new course at right angles to the old course and at 45° from the wind.

Some skippers are a bit hazy as to the distance between two boats on the wind on the same course. It may be expressed thus: If two boats are on the wind on the same course, the distance between the two boats is the sum or difference of two factors. Draw a line through the mast of the trailing boat at right angles to her course until it intersects the wake of the leading boat. The length of that line is one factor. The distance from the mast of the leading boat to that point of intersection is the other factor. The line at right angles to the course counts for the windward boat. The other line counts for the leading boat on the course. The boat that has the longer line is ahead by the difference. If one boat is to windward and ahead on the course, she is ahead by the sum.

Now, if it is clear how to measure the distance between boats on the wind, let us place some boats in different relative positions, all outside the zone of interference, and let us see what happens to them if the wind shifts four points, or 45°. To avoid confusion, I have limited the examples to four-point shifts. The changes in position due to greater or lesser shifts may be easily determined by interpolation.

Now, it is important to know what happens on a four-point shift, because a shift of that amount occurs so often and so definitely. Think how often you have sailed in a light south wind, have felt the breeze failing, and then suddenly had it strike in strong and true from the southwest. Four points! How often you have sailed in a fluky northwester and had the wind strike in suddenly from the north. The next shift is northwest again. And the next may be either north or west. Four points each time. When a rip-snorting northeaster is blowing and the sky starts to clear, the wind seems to step around by fairly definite four-point strides — to east, to southeast, where it hesitates a long time, to south, and finally to southwest.

Here, then, are six cases for study:

CASE 1. Fig. 1.

Assume wind to be from S.W. Then both boats would be headed S. Boat 2 is directly to leeward of Boat 1.

The distance between the two boats is AB (the distance of Boat 2 astern) +BC (the distance of Boat 2 to leeward).

The wind shifts aft four points to W. Then boats would head S.W. Boat 2 would then be directly astern. The distance between the boats is now AC, for Boat 2 is nothing to leeward.

Before the shift, the distance is the sum of the sides of a right angle triangle. After the shift, the distance is the hypothenuse of the right angle triangle.

In the illustration, before the shift, Boat 2 is 5 lengths to leeward and therefore nearly *7 lengths behind.* After the shift, she is 5 lengths astern — *5 lengths behind.*

CASE 2. Fig. 2.

Assume wind still to be from S.W. and boats headed S., as in Case 1. Boat 2 is directly to leeward of Boat 1, as in Case 1. The distance between the boats is the same: AB+BC.

But, in this case, assume that the wind shifts four points forward to S. Now both boats head S.E. Boat 2 is now directly abeam. Boat 1 is to windward.

If both boats should go about, they would be exactly in the position of the boats in Case 1 after the shift. Therefore, distance abeam is equal to distance astern.

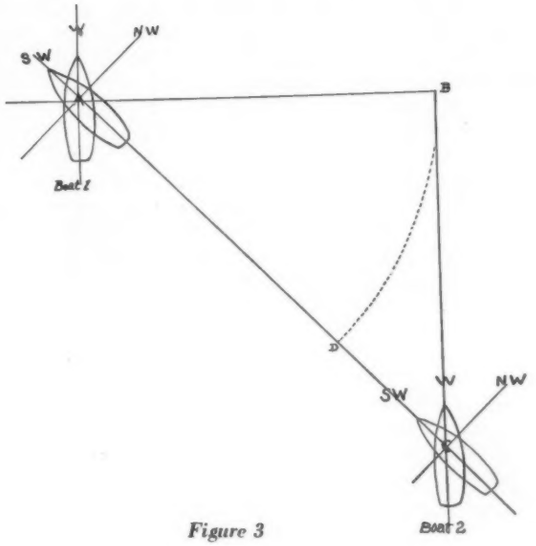


Figure 3

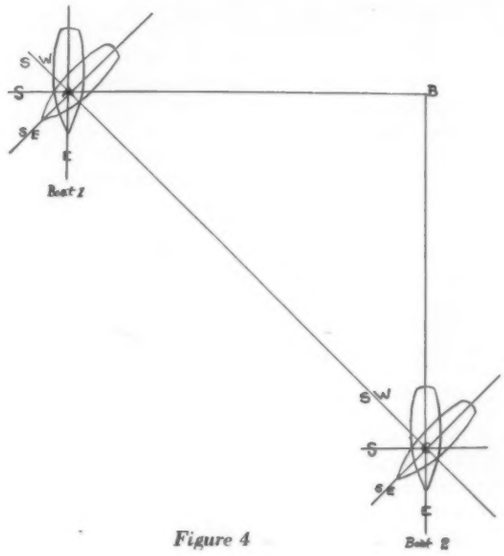


Figure 4

And the distance between the boats is now AC (the hypothenuse); not AB+BC (the sum of the sides). In the illustration, on a four-point shift of wind forward, Boat 2 gains nearly two lengths.

Conclusion: A boat directly to leeward of another boat and outside the zone of interference gains on any shift of wind, forward or aft.

CASE 3. Fig. 3.

Assume the wind to be from W. Both boats are headed S.W. Boat 2 is now 5 lengths directly astern of Boat 1. The distance between them is AC.

The wind shifts aft four points to N.W. Then both boats head W. Boat 2 is now the distance BC astern of Boat 1 and the distance AB to windward of Boat 1. But since AB and BC are equal, there is no distance between them and the boats are even. If Boat 1 should go about and head N., the two boats would meet at B. Boat 2 has gained all of the distance AB to windward and cut down the difference between AC and BC (or CD) in distance astern.

If the wind shifts less than four points, Boat 2 would still gain, but not so much. Her distance behind would equal BC−AB, but BC would have a greater value, and AB would have a lesser value, than in the case of a four-point shift.

If the wind shifts more than four points, Boat 2 would be ahead of Boat 1 and her distance ahead would equal AB−BC, but AB would have a greater value and BC would have a lesser value than in the case of a four-point shift.

Conclusion: Any shift of wind aft favors the following boat. If the following boat is directly astern of the leading boat a shift of four points aft places the following boat on equal terms with the leading boat, *regardless of her distance astern before the shift.* A shift of more than four points aft places her ahead, regardless of her distance astern before the shift.

The only exceptions to this rule are when Boat 2 can overstand the mark because of the shift, or when Boat 1 can outpoint Boat 2. (It is obvious that Boat 1 cannot lay the mark unless Boat 2 can do so, as Boat 2 is the weather boat.)

In the event of Boat 2 being in such a position as to overstand the mark, Boat 1 will still be the leading boat. The reason for this is that the only conditions under which Boat 2 can catch Boat 1 are when the shift places Boat 2 to windward as far as Boat 1 is ahead, so that she can cut down the lead of Boat 1 at the same rate as Boat 1 cuts down the distance of Boat 2 to windward. If Boat 2 can overstand, she gains to windward more than she needs, and Boat 1 will not have to sail so far to windward as Boat 2 will have to sail ahead. Of course, Boat 2 should be able to sail faster with started sheets and that may even things up. So Boat 2 may be able to catch Boat 1 *after the shift* by virtue of sailing faster with started sheets. But if the shift enables Boat 2 to overstand the mark, she is not at that moment on equal terms with Boat 1. I have seen much rejoicing on boats that have thus been enabled to overstand the mark. But it is a matter not for rejoicing but for regret.

CASE 4. Fig. 1.

Assume the same initial conditions as in Case 3 — wind from W.; both boats headed S.W.; Boat 2, five lengths directly astern of Boat 1. As in Case 3, the distance between them is AC.

Now assume that the wind shifts four points forward to S.W. Both boats now head S. Boat 2, instead of being five lengths directly astern is now five lengths directly to leeward and nearly seven lengths behind. Before the shift, her distance behind was AC (the hypothenuse). Now it is AB+BC (the sum of the sides). This is the reverse of Case 1.

Conclusion: Any shift of wind forward favors the leading boat. If the following boat is directly astern of the leading boat, a shift of four points forward places her directly to leeward of the leading boat regardless of the distance between the two boats. A four-point shift forward causes the maximum loss to a boat following another directly astern. A smaller shift will not place her so far to leeward. A larger shift will place her farther ahead than the dead-to-leeward position, for Cases 1 and 2 prove that any shift favors the boat that is dead to leeward, and a shift of more than four points first puts her directly to leeward and then lifts her out of that position.

CASE 5. Fig. 2.

The wind is from S. and both boats are headed S.E. Boat 2 is abeam of Boat 1. She is to leeward, but not directly to leeward. The distance between them is AC. (If both boats should go about and both boats should head S.W., Boat 2 would be the distance AC astern.)

Assume that the wind shifts aft four points to S.W. Now both boats would head S. Boat 2 is now directly to leeward of Boat 1. She is behind by the distance AB+BC — the sum of the sides instead of the hypothenuse.

This is the reverse of Case 2.

Conclusion: When two boats on the wind are abeam, any shift aft favors the windward boat. A shift of four points places the leeward boat directly to leeward regardless of the distance between the two boats. A four-point shift aft causes the maximum loss to the leeward boat directly abeam of the windward boat.

CASE 6. Fig. 4.

Assume the initial conditions of Case 5. The wind is from S. Boats 1 and 2 are both headed S.E. Boat 2 is to leeward and directly abeam of Boat 1. The distance between them, as in Case 5, is the distance AC.

Now the wind shifts four points forward to S.E. Both boats now head E. Boat 2 is now even with Boat 1, for the distance between them is AB−BC=O. If Boat 2 should go about and sail S., she would meet Boat 1 when Boat 2 has sailed a distance equal to AB and Boat 1 had sailed a distance equal to BC.

If the wind shifts less than four points forward, Boat 2 would gain but would not catch Boat 1. The distance between them would be AB−BC, but AB would have a greater value and BC a lesser value than on a four-point shift.

If the wind shifts more than four points forward, Boat 2 would be ahead of Boat 1. The distance between them would be BC−AB, but BC would have a greater value and AB a lesser value than on a four-point shift.

Conclusion: When two boats are on the wind and one is directly abeam of the other, any shift of wind forward favors the leeward boat. A shift of wind four points forward places the leeward boat on an equal basis with the leading boat *regardless of her distance to leeward* before the shift. A shift of more than four points forward places her ahead, regardless of the distance between the boats before the shift.

The only exceptions are when Boat 1 can overstand the mark by tacking, or when Boat 1 can outpoint Boat

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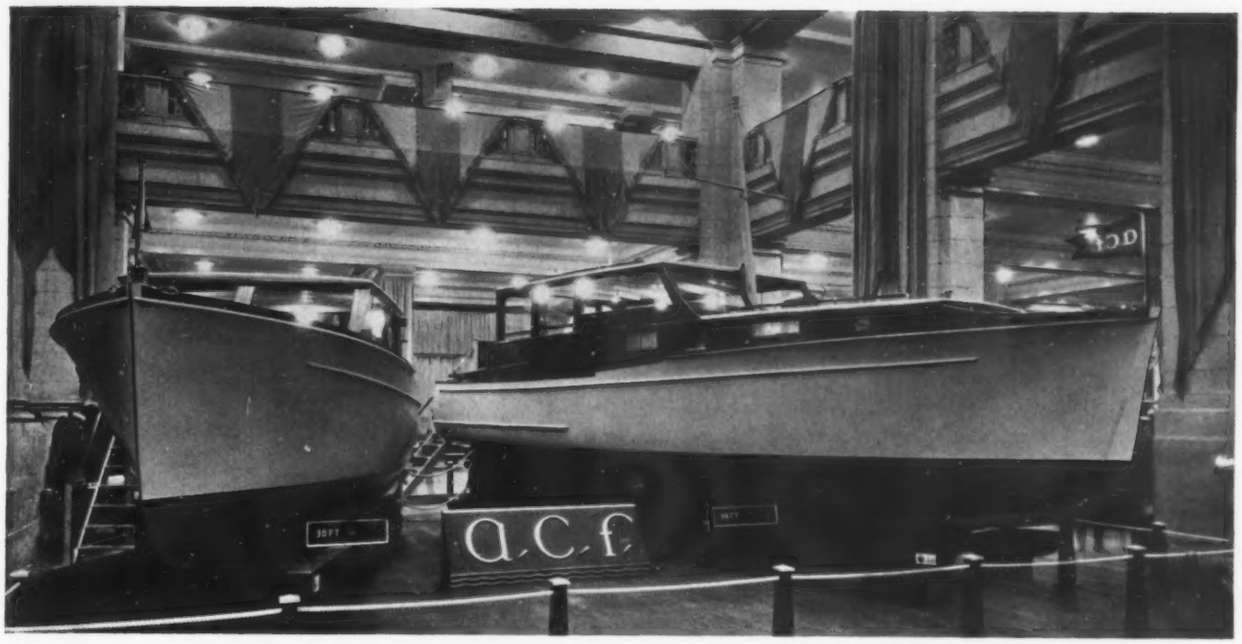
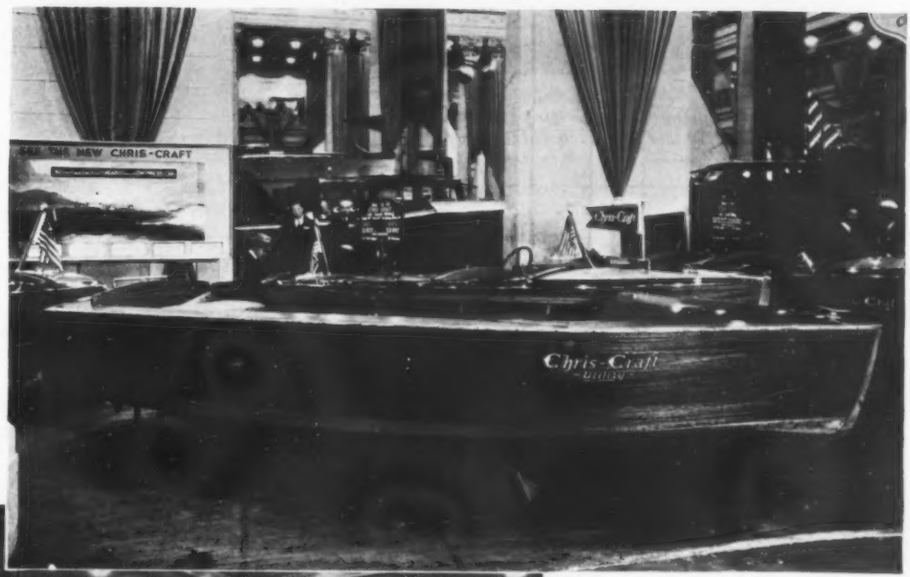


Seen at the Motor Boat Show

The exhibit of boats at this year's show was unusually comprehensive, and covered every type, from an 11-foot Frostbite "dink" to a 54-foot power cruiser



At the top of page are the two a.c.f. cruisers, a 30-footer (at left) and a 36-footer, powered with twin Chryslers. Both models are new and extremely pleasing to the eye

The Chris-Craft Utility model (above) is a 16-footer, handsomely finished. She attracted unusual attention among the large fleet of Chris-Craft runabouts

The two 1934 Richardsons (at left) are the 32-foot Cruisabout and the 28-foot Junior, both thoroughly up-to-date in design and appointment

This smart and able little cruising skipjack was built for only a few hundred dollars by two young amateurs. She has proved seaworthy and has displayed a good turn of speed

How to Build a Skipjack

Two Amateurs Build a 23-Foot Cruising Boat at Small Cost

By

DAN MALLETT

AMATEUR boatbuilding is one of those queer mental afflictions which dominates the personality of the victim and can be cured only by the actual experience of boatbuilding. The first symptom usually consists of finding that one is unconsciously drawing small sketches of the "ideal" boat upon the pages of school books and such like. This symptom rapidly develops until eventually you find yourself attempting to lay down the lines to scale, at which point you begin more fully to visualize the great possibilities — and the impossibilities. It is a pleasant pastime to draw beautiful curving lines and to increase the size of the "ideal" boat to that of an ocean-going yacht; but if you are wise the pipe dreams soon vanish and you foresee the difficulties to be encountered in construction, to say nothing of your pocketbook.

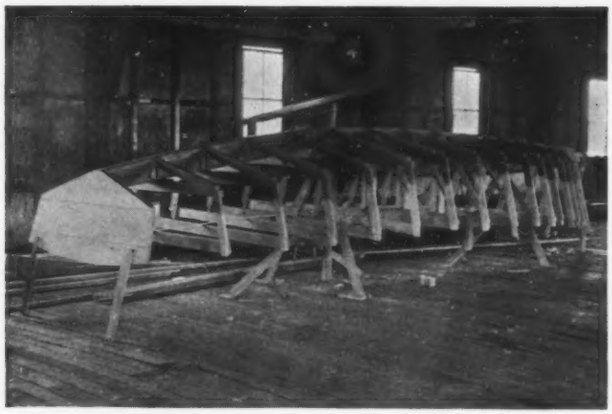
You flounder about in this manner for a fortnight or so until you are able to settle upon some design which approximates your ideal and at the same time is within reason both from the standpoint of your ability as a carpenter and, as previously suggested, within your financial capacity. Once the actual design is completed you may start the construction; from that time until the launching you are in a continuous fog regarding the happenings of the outside world. Indeed, the patient is not entirely normal until the "ideal boat" is actually under sail and has fully demonstrated her merits and weaknesses.

The author began his sailing career at the age of seven, in a flat-bottomed rowboat which employed a square piece of beaver board for a sail. He then advanced gradually through sailing dories, small open knockabouts, catboats and numerous other types of small craft suitable to the weather conditions prevailing on Long Island Sound. With this background, the shallow draft centerboarder was the instinctive choice in selecting a type of boat to build. At this point some readers will no doubt argue the advantages of the keel boat. I do not pretend to offer any argument on this subject, mainly because my experience with keel boats is negligible. Hence, my viewpoint is extremely narrow and could not do justice to the keel boat enthusiasts.

The possibility of building a small sail boat first dawned upon me a few years ago when I was reading an article in the April, 1928, issue of YACHTING, entitled "A Glorified Sharpie," in which a novel method of building a chine boat was described. The striking feature of this boat, to my mind, was the use of a backbone member built up of two planks set on edge, between which the stem, mast step, centerboard posts, and sternpost were fastened. The ribs were then secured to either side of the backbone. This type of construction provides a fool-proof method by which the amateur is enabled accurately to line up the frame work, upon which the success of the entire boat depends.

This idea remained stowed away in the back of my head and was not greatly enlarged upon until I came across the article entitled "The Skipjack," which appeared in the June, 1932, issue of YACHTING, describing in detail the lines and construction of the typical Chesapeake Bay skipjack. It was the mysterious, graceful, clipper bow and the great possibilities of making various modifications of this distinctive type of boat which first caught my attention, not to mention its excellent sailing qualities. Suddenly, I realized the possibilities of building a boat along these lines and at the same time employing the backbone method of construction.

At this point I took my close friend Bill into my confidence. Strangely enough, he, too, was suffering



With chine construction, the frames were easily cut out and set in place, forming a simple but strong structure. (Top) The backbone was made of three pieces mortised together

from the effects of the boatbuilding bug and needed little persuasion to appreciate the great possibilities of a combination sharpie and skipjack. For the next few weeks most of our waking moments were spent crawling about on our knees, drawing and erasing lines upon large sheets of wrapping paper tacked to the bedroom floor. We consulted innumerable pictures of sail boats of every size and description in an attempt to get a more definite picture in mind. The further we looked, the more confused we became. Certainly, it is a good plan to let more than one person have a hand in the designing of an amateur boat, for if the final product represented the wild imaginings of only one person, the result would probably be a freak. Two people with slightly different ideas on the subject will eventually compromise, and stand a better chance of arriving at a more conservative design. Gradually, we managed to agree on lines not too far from the original skipjack and bearing a slight resemblance to those of the Friendship sloop. It now became necessary to make a few calculations regarding centers of effort and lateral resistance, also the displacement, center of buoyancy, and the probable weight of the complete boat. From the consensus of opinion found in books dealing with the design of small, shallow draft boats, it was discovered that a lead of seven per cent of the waterline length of the center of effort over that of lateral resistance should produce a well-balanced rig. Fortunately, this advice has proved correct in actual practice in the case of our boat.

We next selected a scale of one inch to the foot, and set to work drawing the finished lines of our "ideal" boat. This scale was selected because it reduced the chances of making careless mistakes in laying down the full-size lines, and also because it provided an easy method of checking between the plans and the boat during the entire course of construction. The outstanding difference between our final lines and those of the original skipjack was due to the fact that we raised the chine approximately three inches above the waterline at the bow. This modification relieved the flat appearance of the sides and at the same time produced an easier entrance, thus decreasing any tendency to pound. This change proved successful, for she slips through a chop with little or no fuss, an unusual performance for a chine boat. A further change was made by omitting the large cutwater. With all due respect to the Chesapeake Bay sailors, we are sorry to say that we feared a contrivance of this nature would cause unending laughter and ridicule on Long Island Sound. Furthermore, we could not see that the cutwater served any real purpose.

The rig also received slight alterations to suit our particular tastes. The mast was set a bit farther aft and the noticeable rake was done away with. The large headsail was replaced by a staysail and a flying jib. This rig looked a bit more modern and we believed it would be more efficient than the old rig. It enables us to keep the rig nicely balanced during a stiff blow under reefed mainsail and staysail. In moderate breezes the large flying jib pulls like a horse and keeps the boat footing along at a great pace.

A small cabin, with four-foot headroom, was drawn to accommodate a small bunk on either side of the centerboard trunk and to provide ample storage space for all the gear necessary for a short cruise. The cockpit was

Planked up, her lines show good bearing and a nice clean run. (Top) The bow view illustrates clearly the method of shaping the planks to meet the chine, stem, and keel

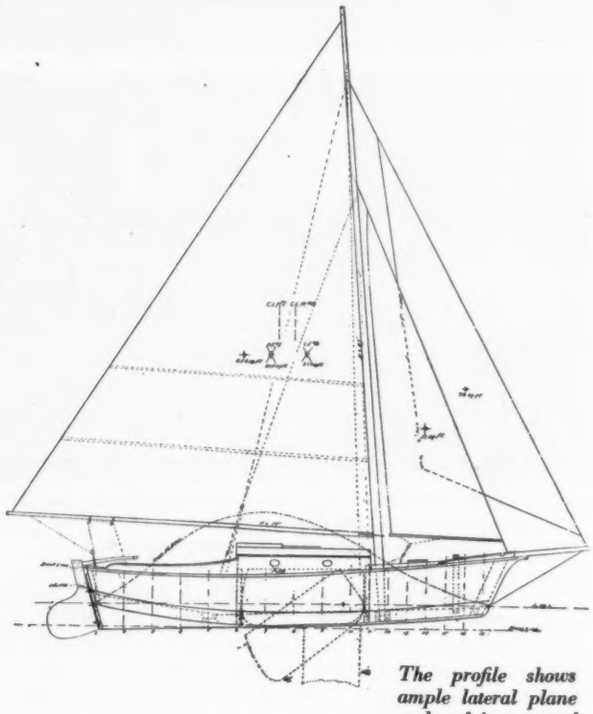
maintained a full six feet long by an average width of five feet, in order that we might sleep two friends on board under a tent-like arrangement over the boom.

With the plans thus completed, we started scouting around local lumber yards for suitable wood at a reasonable figure. White oak was obtained at nearly the wholesale price from a dealer who was anxious to liquidate his surplus stock. The entire backbone and rib work came to less than eighteen dollars. A carefully selected stock of ¾-inch cypress was procured for the planking. Cedar would have been a trifle better for this purpose, but none was available in the local yards. Furthermore, the cypress was about one-third the price quoted for a good grade of cedar, which in itself is a deciding factor for amateur boatbuilders of limited capital.

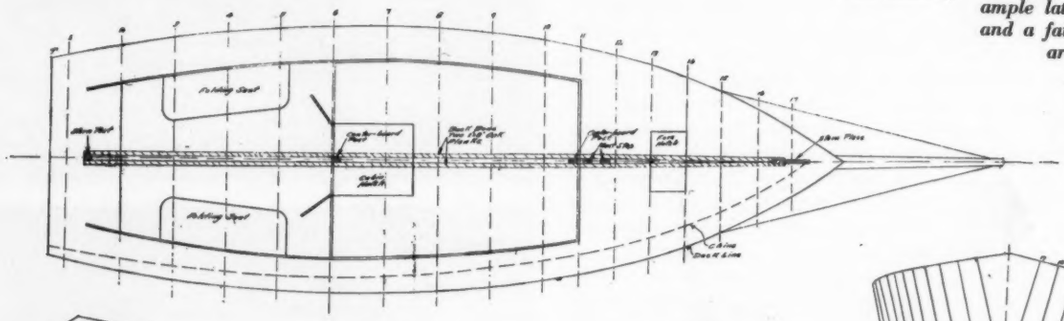
Having collected the necessary lumber for the hull, the construction was immediately started. The first operation consisted of laying down the lines of the backbone to full size on the level, concrete floor of a large garage. The base line shown in the plans was first carefully drawn. The perpendicular offsets from the base line to the lower edge of the backbone were located and a smooth curve was drawn through these points, using a long, thin, wooden batten as a guide. The stem, mast step, centerboard posts, and sternpost were also drawn in place to full scale. Since the overall length of the backbone member was 21 feet, it was impossible to make either half out of one continuous piece of wood. However, it was found that 15-foot lengths of 1″ by 8″ white oak could be obtained, which enabled us to mortise on a short length of the same kind of wood to the 15-foot length to complete the required overall length of this member. The mortise joint in either half of the backbone was made at a point about 20 inches abaft the centerboard trunk. This joint was considerably strengthened by fastening a piece of 1½″ by 8″ timber between the two halves of the backbone, which filled the opening between the sternpost and after post of the centerboard trunk, making this portion of the backbone solid. The distance between the halves of the backbone was kept at 1½ inches throughout the entire length of the boat, with the exception of a short stretch forward of the mast where the halves were tapered together as they ran into the stem to provide sufficient clearance for the garboards at this point. The stem, mast step, centerboard posts, and sternpost were set in place in marine glue, and large galvanized carriage bolts were run through them.

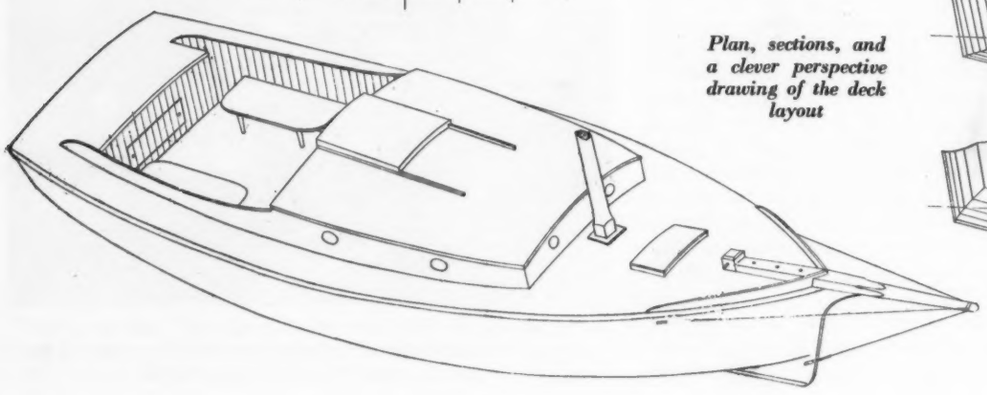
We were now ready to start work on the ribs. The sections on the plans were reproduced full size upon large sheets of wrapping paper laid on the garage floor. One-inch by three-inch white oak was used for the ribs. No sawing was required, as all of the sections were flat, which resulted in a big saving in both wood and labor. The strips of wood were laid over the full-sized sections

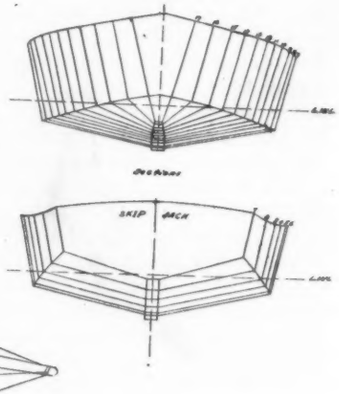
(*Continued on page 86*)



The profile shows ample lateral plane and a fair curve of areas







Plan, sections, and a clever perspective drawing of the deck layout

Johnson's "Comet"

The Development of a Popular One-Design Class

By

JAMES F. SLANE

The 16-foot one-design "Comet" was designed by C. L. Johnson, of Easton, Md., and her plans appeared in the March 1932 issue of "Yachting." The little boat has proved so popular, due to her speed, fine sailing qualities, and low cost, that more than sixty have been built in various parts of this country

TWO years ago, an unknown little sailboat appeared, and was heralded in the pages of YACHTING, under the heading "A Young Brother of the Stars for Chesapeake Bay." The design resembled that of a Star boat reduced to a 16-foot centerboard sloop. Its qualities were soon discovered, and those who have followed its course have found it living up to the classification name it now bears, the "Comet."

Mr. C. Lowndes Johnson, a native of the Eastern Shore of Chesapeake Bay, and skipper of *Eel*, Star Class International Champion of 1929, undertook to combine the good points of the Star and of other class boats into a shoal draft sloop. Johnson no doubt felt that this was an experiment, and undertook it, perhaps, because of the trend towards the one-design small class boat which is becoming more and more pronounced each year; but judging from the results, his experiment has developed into a venture of wide proportions.

In his technical treatment, the designer has shown great skill, giving the boat a decidedly yachtlike appearance, turning out a sailboat which will fill the requirements both of racing and pleasure sailing. Throughout the plans, little details can be found which prove that he has incorporated in the design a profound knowledge of the qualities of a sweet sailboat. Briefly, Mr. Johnson has given us a centerboarder, drawing only 6 inches when the board is raised, and 2 feet, 6 inches when it is down; 16 feet long, 5 feet of beam, and a modern jib-headed rig containing 130 feet of canvas. Of its design, little need be said. Just picture a Star boat without a keel, a few feet smaller, with a rounded bottom, flaring topsides, gracefully lifted ends, and adapted to shoal waters. The construction is especially strong in order to withstand rough seas and hard usage. The fifteen frames give an unusual amount of strength, yet the plans allow for optional use of planking of $\frac{5}{8}$ inches on the bottom and sides. The forward deck is carried well aft, insuring a dry boat in most seas, with ample deck on both sides. The cockpit can be arranged to suit the purpose for which the boat is to be used, racing or day sailing. The spars are solid, and may be rounded, oval, or pear-shaped, upon which can be bent canvas not lighter than four ounces.

It seems that speed and appearance were the main objectives, yet here is a boat which can be produced and sold for $300 or built for even less by any amateur boatbuilder. The "Comet" is a low-priced, one-design class sailing boat, suitable for both senior and junior sailors, be they seasoned skippers, or just learning the feel of a tiller. It is a boat for those of limited means; a design to encourage amateur boatbuilders, as there are no steambent planks, or ribs, or other difficult points of construction. Finally, the boat is an ideal one for yacht clubs wishing to establish a new, fast, attractive one-design class for racing, where shoal water is a problem, and transportation for interclub racing must be considered. As a boat for the family, and for long summer afternoon sails, the "Comet" is especially desirable.

There are, of course, smaller and larger boats which are faster than the "Comet." The old-fashioned "Jersey Cricket," for example, is faster than the Star boat, and the double bilgeboard "E" sloop is faster than the *Vanitie*. This, however, does not mean that there is danger of the "Crickets" displacing the Star boats, or that the "E" sloops will eliminate the America's Cup racers.

The prime recommendation of the "Comet" is that

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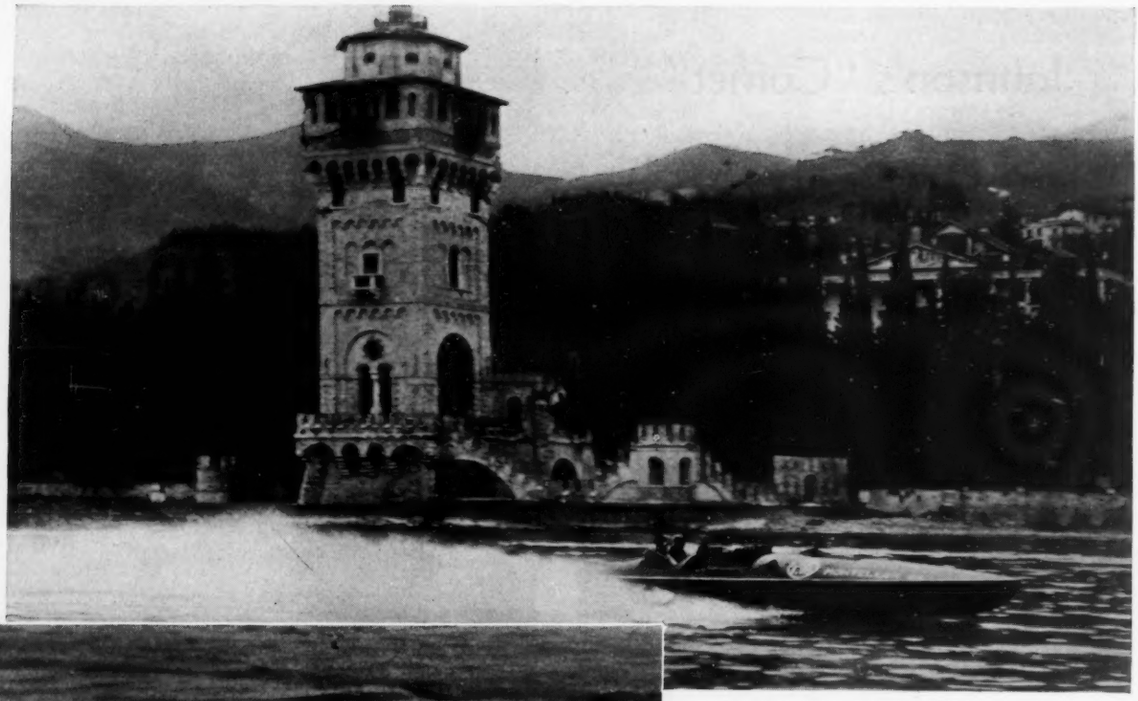

Count Theo Rossi will compete in the International 12-Litre speedboat races to be held in Florida this month with his racer "Montelera XV," shown above during a run on Lake Garda, Italy

At left, Count Carlo Casalini driving his Soriano-powered Class X outboard racer, which he planned to enter in the Florida races

The Month in Yachting

The International Motor Boat Races in Florida

RACING schedules for the three Florida international motor boat regattas at New Smyrna, Palm Beach, and Miami Beach this month have been approved by the racing commission of the American Power Boat Association.

Inboard runabout, 125 and 151 cubic inch hydroplane, cruiser, and American outboard events have been added to the various racing programs. These will be featured by the International Class X outboard and 12-Litre contests which will bring together the pick of American and European pilots from Great Britain, France, Italy, Sweden, and Spain. Ten drivers, representing five foreign countries, have definitely entered the international outboard events and the Italian 12-Litre team will number four or five boats.

The opening gun in the international series will be fired at New Smyrna on March 3rd when the first of the 10-mile outboard qualifying races are run. The Smyrna Yacht Club's two-day regatta program also will include the Governor Sholtz and Sir Thomas Lipton Trophy races for outboards, open events for Class A, B, C, and F outboards, and Class D, E, F, and I stock runabout races.

Elimination trials for American outboard pilots will be held at New Smyrna starting March 1st. More than 15 drivers will compete for a place on the four-man team which will represent the United States in the international outboard competition.

From New Smyrna the regatta activities will move to Palm Beach where the first 30-mile race between the Italian 12-Litre team and American Gold Cup drivers is scheduled. A three-day program has been arranged by the Palm Beach Yacht Club for March 9th, 10th and 11th, including additional International Class X outboard qualifying events, races for American outboards, cruisers, 151-cubic-inch hydroplanes and Class H, I, and E inboard runabouts.

The international finals will take place at Miami Beach, March 16th and 17th. The deciding event in the Class X international championship series will be run and the world's 12-Litre title holder will be selected in the two final 30-mile races in this series. The Miami Beach Yacht Club also has scheduled express cruiser and 125-cubic-inch hydroplane races, Class B, C, F, H, and I inboard runabout events, and open races for Class A, B, and C American outboards. The Colonel Green Trophy, one of the most famous of outboard prizes, will be open to Class F and smaller outfits.

The coming international racing series is creating tremendous boating interest in Florida this year. The program is one of the most ambitious ever undertaken in this country and should attract an unusually large gathering of motor boat racers.

The "Tusitala"

PHILIP KAPPEL'S latest etching, which appears in this issue of YACHTING, will be of more than usual interest to the lovers of old-time sailing ships. To many, the ship *Tusitala* has become almost an institution, for she has the distinction of being the last full-rigged American merchant ship going deep water. "Tusitala," meaning "teller of tales," was the name conferred on Robert Louis Stevenson by the Samoans. And this beautiful old ship is the teller of a last tale of the days of sail. In this connection, it is interesting to know that her former master, Captain James P. Barker, maintained all the traditions that were to be found in the most glorious period of maritime history.

In etching the *Tusitala*, Mr. Kappel consulted with Captain Barker so that the print may be regarded as exceptionally accurate in all details. An added point of interest will be that each print will be inscribed by Captain Barker as well as by the artist. The edition is limited to one hundred copies, after which the plate will be destroyed. As these etchings will not be obtainable through the usual channels, YACHTING will be glad to forward any orders from its readers to the artist's special representative.

The St. Petersburg-Habana Race

ALL indications point to a record fleet of starters in the coming St. Petersburg-Habana Ocean Race, which starts from the Florida port on March 25th and takes the contestants across the turbulent Gulf Stream and deposits them in the lovely city of Habana, Cuba, where the Cubans will forget their political troubles and concentrate their best efforts towards entertaining the visiting yachtsmen. Early in February there were no less than twelve definite entries, with another dozen or so practically assured.

► A communication from L. L. McMasters, Chairman of the Race Committee of the St. Petersburg Yacht Club, gives the following definite entries:

Artemus, 38-foot yawl, owned by Frank B. Chapman, of Berlin, Wisconsin. This is a new craft, launched at Manitowoc, Wisconsin, last October, and sailed to St. Petersburg *via* the Mississippi River.

Wilma Mae, new 32-foot ketch, owned by Henry Phillips, of Detroit, which also traversed the Mississippi on her way south.

Onawa, 50-foot yawl, Donald Malpass, of Philadelphia.

Eloise, new 33-foot yawl, owned by I. G. Archibald, of Sarasota, Fla.

38-Foot schooner owned by C. R. Parks, Chicago.

Lanakai, 43-foot schooner, Dr. A. C. Howe, Brooklyn.

Windjammer, the famous schooner owned by Garner H. Tullis.

Marelen II, owned by Kent Curtis, which came in third in Class B in the 1933 race, but not under power as incorrectly reported.

Little Dipper, 25-foot yawl, Wally Bishop.

Pieces of Eight, 32-foot yawl, F. G. Wagner.

Cynosure, the veteran 36-foot ketch, which will be sailed this year by Commodore L. D. Lewis, of the St. Petersburg Y. C.

Wawatam, 40-foot yawl, Homer V. Agee.

Gamecock, the scrappy little Alden-designed yawl owned by Wm. B. Allen, winner in Class B last year.

The following craft are expected to enter before the date set for the start:

Haligonian, Houston Wall's 45-foot schooner, 1933 winner.

Antonia, Harkness Edwards' 69-foot schooner.

Casco, 57-foot schooner, E. E. Kelso.

Mallard, 46-foot schooner, Maumus Claverie, New Orleans.

Polux, 27-foot sloop, from the Habana Yacht Club.

Commodore Rafael Posso, of the Habana Y. C., will be in charge at the finish of the race, and has promised even more elaborate entertainment than in previous years.

The Habana Y. C. is offering first prize in Class A and the St. Petersburg Y. C. is giving first prize in Class B. There will also be the usual handsome silver trophies for the first boat to finish the course, and for second and third places in the race.

The new yacht club at Nassau which should prove a decided attraction and which is open to visiting yachtsmen

The new "Hussar," owned by Edward F. Hutton, recently arrived at Miami on her first trip to the United States from Bermuda

The Past Season on Gull Lake

THE 1933 racing season on Gull Lake, Michigan, was a most successful one. Memorial Day marked the season's opening with a handicap race in which fourteen of the thirty-five boats on the lake entered. The 22-Square-Metre *Alg*, owned by J. S. Adams and sailed by J. L. Dane, placed first. *Yvonne*, also a metre boat, came in second and Commodore Hayward and W. Lawrence's *Lightning*, third.

During the season, on Saturday afternoons, class races were held for the "Rs," Stars, "Cs," 22-Square-Metres, and the 250 Class. Sunday mornings the metre boats, Stars, and "Cs" again raced. General handicap events were held Sunday afternoons with points earned counting both for the handicap trophy and each respective class trophy.

On August 5th and 6th a Visiting Skippers regatta was held and sailors from the surrounding yacht clubs were entertained. In a three-race series, in which the local boats were manned by visiting skippers and crews and boats were changed for each race, the skippers placed, by points earned, in the following order; first, Joseph Krolik; second, William Fors; third, Neil Lynch; fourth, Edgar Flinterman; fifth, Edgar Kiefer; and sixth, C. R. Harvey.

In September the Gull Lake yachtsmen sailed as guests in Detroit craft, in the annual sweepstakes on Lake St. Clair. The following day two events, raced in the Detroit 22-Square-Metre fleet, were arranged for them. The races were held off the Grosse Pointe Y. C. in a 30-mile breeze, making the occasion one to be long remembered by all participating. Each race was sailed in a different boat and points were earned by the skippers as follows: Jack Dane, 15; Warren Siebold, Dan Parker, and Bert Britigan, tied for second with 12; W. Shackleton, 11; Arthur Redner, 10; Commodore Hayward, 9; and Winship Todd, 8.

At the Labor Day dinner trophies were presented as follows: *Lightning*, Hayward and Lawrence, took the Championship of the Lake, the Sunday Handicap and the Class R cups; and Todd's *Fantome* received the other Class R award. Upjohn's *Naia*, a 22-Square-Metre, took the Kalamazoo Gazette Cup and the Weisgerber Trophy. Burdick's *Esmerelda* was first in Class C. Bruce Williams' *Zete* took the yacht club Star Class Cup and Jack Dane's *Jupiter* the Star fleet series. Andrew Galloup received the Britigan Cup in the 250 Class. J. S. Adams received the Memorial Day Cup and the Kalamazoo Sea Scouts were awarded the Labor Day Cup.

J. L. DANE

"Lightning," an "R" boat owned by Commodore Ralph Hayward and William Lawrence, took the past season's championship of Gull Lake, Michigan

The new Dyer chine-built Frostbite dinghy which has proved a smart sailer and a handy utility boat

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"Fritz" Takes Stuart Cup

DESPITE the vain attempt of the Four Lakes Ice Yacht Club to acquire the Hearst Cup, it immediately issued a challenge for the Stuart International Cup, the first race to take place on January 20th. In this event the *Fritz*, sailed by Carl Bernard, made short work of the series by defeating the *Debutante III*, which had never before been beaten, in three consecutive races.

The *Fritz* carried 350 square feet of sail as against the 650 hoisted by the gaff-rigged *Debutante III*, the defender of the Oshkosh Ice Yacht Club, sailed by John Buckstaff for Douglass and Camp Van Dyke. Due to the fact that the light wind experienced during the series was not what it takes to make the *Debutante III* live up to her reputation of being the fastest boat on ice, the comparatively small, light *Fritz*, ably handled, was able to do the unexpected.

Lake Winnebago, the home of the defender, supplied nothing but light wind and sluggish ice and, although the defending club had the option of awaiting better conditions, it was decided to see the bid through without delay. The courses were 20 miles, windward and leeward, and the winner of the series had to win three times out of five.

Sailing single-handed in *Fritz*, while the *Debutante III* and her partner, the *Flying Dutchman*, and the *Miss Alice*, all carried two men each, Carl Bernard took the lead in the first race and maintained it for four laps, finishing in 43 minutes and 25 seconds. With Andy Pflum at the helm, *Miss Alice* took second place; the *Flying Dutchman*, sailed by J. Camp Van Dyke, was third; and the defending *Debutante III* was fourth.

The second race on January 21st again found the wind too light to move the big *Debutante III*. Hard to get started, she yielded a substantial lead to *Fritz* and on each trip around the

C. P. Barber's cutter "Enterprise," which he has sailed across the Atlantic three times, in City Island where she was taken by the Coast Guard after going ashore in Manhasset Bay in one of the recent northerly gales

course lost more and more "ground" until the challenger was nearly half a lap ahead at the finish. *Fritz's* winning time was 71 minutes and 2 seconds.

Bernard needed but one more victory to get the trophy, and the next morning's race, sailed in a heavy fog, took care of the matter. In an increasing wind and on faster ice than previously, *Debutante III* lost her slight edge over the *Fritz* by confusing the third weather mark for the finish. *Fritz* came right up and led the way to the buoy where the officials had posted themselves. Sensing the error, *Debutante III* followed, finishing one minute later than the *Fritz*, whose time was 56:27. Madison's co-challenger followed the defender across the finish, and the *Flying Dutchman* was fourth.

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Ice Boats Race for International Cups on Lake Winnebago

THE challenge of the Four Lakes Ice Yacht Club, of Madison, Wisconsin, for the Hearst International Cup, was defended in January by the Oskosh Ice Yacht Club with their best light and heavy weather craft, the *Donnie D* and the *Flying Dutchman*, respectively. Two challengers invaded Lake Winnebago with higher hopes than those of last year, but after honors were equally divided after the fourth race of the series, the fifth and deciding race went to the defending club.

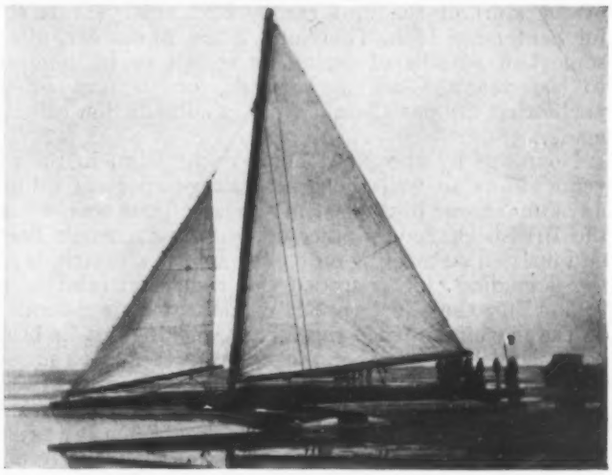
The first race was to have been sailed January 6th, but the absence of anything but flat air deferred the racing until the morning of the 8th. On that day light wind favored the challenger, *Fritz*, sailed by Carl Bernard, and the co-challenger, *Miss Alice*, piloted by Andrew Pflum. *Fritz* scored two victories. Bernard, who was sailing the *Fritz* for Fred Jungbluth, maintained his lead for the entire 20-mile windward and return courses in both races. *Miss Alice* finished second in each. The winner's time was 1:05:01 and 1:10:55. The defenders suffered from the light wind.

It looked as if *Fritz* had the affair as good as sewed up at the close of this day's racing, and Carl Bernard had proved himself a skipper of no mean ability against Oshkosh's best talent, John Buckstaff, who sailed Douglass and Camp Van Dyke's 450-square-foot defender *Flying Dutchman*. The latter was too heavy for the light wind and retired about midway, leaving the defending work up to Ray Schroeder at the helm of *Donnie D*. The latter took third place in both.

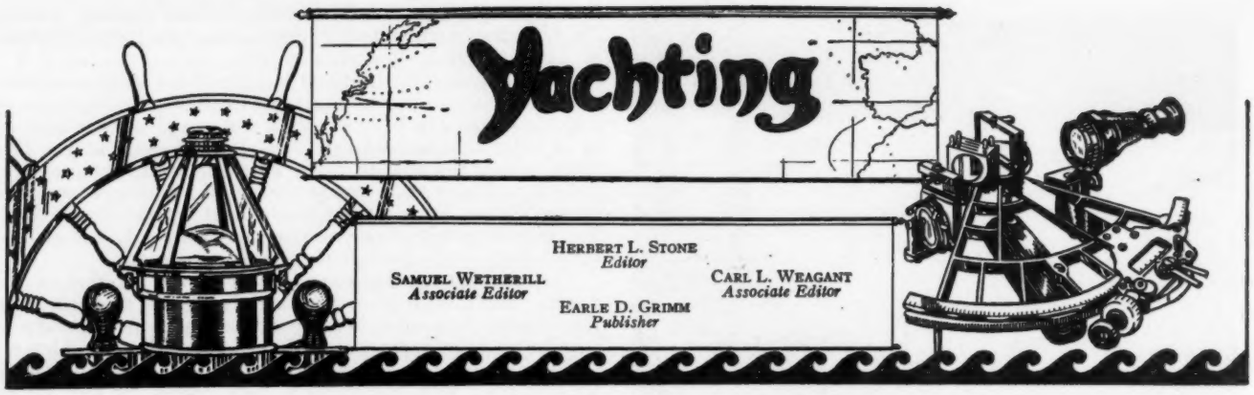
After a day of calm, the wind came hard out of the southwest on the morning of the 10th and put the *Flying Dutchman* back into her stride. The blow was what she craved and she profited by it after the pace-setting *Miss Alice* capsized at the first mark, giving the lead to *Fritz*, which, in turn, was forced to yield it to *Flying Dutchman* at the end of 15 miles because of a broken runner. Buckstaff led the disabled *Fritz* across the finish line with a margin of one minute and 15 seconds, the elapsed time being 54 minutes and 36 seconds.

Due to some misunderstanding as to the position of the weather mark, both *Miss Alice* and *Fritz* failed to finish more than one lap (four miles) in the fourth race, and *Flying Dutchman* was declared the victor. *Donnie D* capsized at the second buoy.

The morning of the following day brought signs of diminishing wind. Under such conditions it was useless for the *Flying Dutchman* to attempt to get underway, and *Donnie D*, with Edwin Friederick as skipper, was delegated to do the defending. The little 250-rater, with considerably less sail area than the challengers, did what the *Flying Dutchman* might have done if the wind had been ample to move the heavy boat. However, the *Fritz* took and kept the lead for a considerable distance, until an unexpected gust struck her sharply and toppled her over. Her capsizing gave the trailing *Donnie D* a break in the deadlock, and she sailed the remaining 12 miles without being pressed by the *Miss Alice*. *Donnie D's* time for Oshkosh's third victory was 63 minutes, some two minutes better than that of *Miss Alice*, and only 12 minutes under the time limit.



The "Flying Dutchman," sailed by John Buckstaff and owned by Douglass and Camp Van Dyke, won the International Hearst Cup Trophy on Lake Winnebago. (Top) The crack iceboat "Debutante III," of Lake Winnebago, Wisconsin, with "Stormy" Doemmell at the sheets and John Buckstaff at the helm



EDITORIAL

Changing Sporting Ethics

THE most important of the 1934 America's Cup Race conditions, printed elsewhere in this issue, is that which allows the challenger to substitute another yacht for the one named in the original challenge if it be found that the latter is not the fastest of her class. This means the removal of the greatest handicap a challenger has had to face during the last twenty years of competition, and is something entirely new in America's Cup races. No matter how fair and equitable the conditions for sailing the race have been in the past, the fact remained that a challenger had to name his yacht (usually before she was built) some ten months in advance, and race her whether or not she turned out to be the fastest boat in her class in the challenging country. Whereas we could — and often did — build three or four yachts for the defense, and pick the fastest after a hard series of trial races, naming her only a week before the race. The advantage this gave us is apparent to every yachtsman.

Now all this is changed. Under the new condition the challenger (this year it is Mr. T. O. M. Sopwith) shall have the right to substitute another yacht for the one named in the challenge up to within sixty days of the start of the first race, which this year is set for September 15th. Therefore, if the *Endeavour*, after some two months of racing, is shown to be inferior to last year's Class J *Velsheda*, or to any other yacht that fits our Class J rules, a substitution can be made.

No move by the New York Yacht Club in recent years shows so well the great change sporting ethics have undergone in the last fifty years. Time was, when the British challenger objected to racing a whole fleet and insisted on meeting only one yacht in a match, that the defending club conceded this right, but inserted a "joker" to the effect that it would name its defender on the morning of each race. Then, picking out its best heavy and light weather racers, it proceeded to name its boat each day in accordance with the promise of the weather. And the sporting ethics of the day supported this action. In fact, those were the days when it was an axiom of sport "that a match was won when the terms were made."

We understand that this year's America's Cup Committee inserted the clause under discussion of its own volition, and without any request from the challenger. Fine! Certainly, times have changed — and men with them!

International Racing in Florida

MARCH will see the first of the international races of what will be a big international year when Florida is invaded by several European speed boat champions who will attempt to take the American power boat racing men over the jumps. Some of the best of the Italian and French drivers are bringing over boats for the 12-litre events and will be seen at the two regattas scheduled for Palm Beach, March 9th, and at Miami the following week. In the outboard events some ten drivers, representing five European countries, will compete against many of our foremost outboard pilots. In this class the racing is to start at New Smyrna, March 3rd, and will be continued at Palm Beach and Miami later, when the 12-litre events are run. It all ought to be a fine show, and a fitting prelude for the races to follow in northern waters later in the season.

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Scows vs. Catamarans

A REVIVAL of interest in catamarans is hard upon us. Following the building of one or more of this type last fall at Herreshoff's, a catamaran called a sailplane attracted great attention at the recent Motor Boat Show, where literally thousands watched a model of this boat sail circles around a model of conventional type.

Speeds of 20 miles or so are claimed, and apparently have been substantiated, with these catamarans. They furnish a thrill in sailing not possible with the heavier, displacement types, weighted down as they are with lead. The only comparable speeds under sail are those made by the bilgeboard scows, sailed in several localities in this country, but chiefly on the inland lakes of Wisconsin and Minnesota. Records show speeds of 18 to 20 miles-per-hour, or, perhaps, more. Why not get the two types together and let's find out what's what? A race on any of the inland lakes between one of the Detroit catamarans and a Class A scow should be productive of keen competition and might add much to our scant knowledge of the new type. Or the sailplane mentioned above could be shipped to some point where the two types could meet. To beat a full displacement boat carrying a lead mine on her keel does not prove much, but to pit these two minimum displacement racing machines against each other would surely result in a race worth going miles to see. Why not get them together?

IN THE WORLD OF YACHTING

GEORGE P. GRANBERY

HERE we have George P. Granbery, father of handicap racing as practiced on Long Island Sound, and at many other yachting centers where yachts of different sizes and classes are raced together.

Now, George Granbery, familiarly called "Cap'n Rube" by those who know him best, would rather sail a boat than do anything else in the world; and when he sails a boat he needs must race her, and race her to win. It was back in 1907 that he conceived the idea of forming a handicap racing class to bring together yachts that had been outbuilt, that did not fit any class then racing, or that were not built to any particular rule. There were plenty of such yachts in existence, with owners willing and anxious to race if some equitable basis of handicapping could be evolved. So a handicap system, using as a basis a percentage of the elapsed time of the winning boat in a race, instead of an allowance based on rating, was worked out, and the Handicap Class of Long Island Sound was organized. It proved a success from the start and has provided good racing for its members for twenty-seven years, while the system of handicapping it developed was copied in many sections of North America. Granbery was president of the organization for the first fifteen years of its existence.

"Cap'n Rube" was brought up in boats. He started sailing catboats on Great South Bay at the tender age of ten years. The yachts he has owned since then have been many, including the 21-footer "Firefly" in which he won the Long Island Sound Championship in 1903, the 22-footer "Rube," the Bar Harbor 31-footers "Senora" and "Joker," the Class P "Olympian," the 30-footer "Dahinda," the 20-rater "Fifi," and many others. His present boat is the Herreshoff sloop "Anita." For the past five consecutive seasons he has won the Larchmont Race Week series in the Handicap Class. He has also done his share of ocean racing, having sailed in two Bermuda Races, in the Cape May Race on "Cara Mia," owned by the late Stuyvesant Wainwright, and in several races for the Brooklyn Challenge Cup.

Mr. Granbery's yacht club affiliations are with the New Rochelle Yacht Club, the Cruising Club of America, and the Lloyd's Harbor Club.

Conditions For the America's Cup Race

Rules for the Race in September Approved by the New York Yacht Club and the Royal Yacht Squadron

THE full conditions for the America's Cup race to be sailed off Newport September 15th have been announced by the New York Yacht Club and are given herewith. On the whole they are very similar to those of 1930, but with two major exceptions. The challenger need not be named until two months before the race, which gives the British a chance to select a boat after trial races in the spring. And in the event that one of the boats is disabled during a race, the survivor is obliged to finish and is not allowed to drop out in the name of sportsmanship. Thus, the skipper is relieved of any possible criticism by the public, which does not understand that the race is as much a test of hulls and of gear as of seamanship.

These conditions were recently approved by the America's Cup Committee of the New York Yacht Club, over the signature of Mr. Cormack, the secretary, and for the Royal Yacht Squadron by their representative and secretary, Captain F. W. Walshe, R.N.

Conditions to govern the races for the America's Cup, under the challenge of the Royal Yacht Squadron, dated 13th October, 1933, as agreed upon by the Committees of the Royal Yacht Squadron and the New York Yacht Club.

Note. — Wherever time is referred to in these Conditions it is Eastern Standard Time.

DATE OF RACES:
The first race shall be sailed on Saturday, September 15, 1934, and the races shall be sailed on every succeeding week day, provided however that immediately on the conclusion of each race or upon a race being called off for the day, the Race Committee shall enquire of each contestant whether he is willing to start the next day. Should either contestant reply in the negative one day shall intervene before starting the next race. Sunday shall not count as such intervening day.

NUMBER OF RACES:
The match shall be decided by the best four out of seven races.

COURSES:
Races shall be started from a mark anchored nine nautical miles S.E. (Magnetic) from the Brenton Reef Lightvessel.

First Race — Fifteen nautical miles to windward or leeward and return.

Second Race — A triangle with approximately ten nautical miles to the side.

Further races to be alternately windward or leeward and triangular.

All races to be started to windward if in the opinion of the Race Committee it is possible.

The compass direction of the courses to be signalled as early as possible and the tug bearing the marks to be started not less than ten minutes prior to the warning signal.

START:
The warning signal shall be made as nearly as practical at 10:30 A.M. No race shall be started after 12:30 P.M.

POSTPONEMENTS:
The time of the warning signal shall not be changed except as follows:

a. By the Race Committee in case of fog.

b. By the Race Committee if, in their opinion, the space around the starting line is not sufficiently clear at the time appointed for the start.

c. By the Race Committee if, in their opinion, the wind is so light or fickle that it is not practical to determine a windward or leeward course.

If in the opinion of the Race Committee the weather shall be, at the time appointed for the start of any race, or threaten to be, of such severe character as not to afford a reasonable opportunity of fairly testing the speed of the two yachts, the race may be postponed in the discretion of the Race Committee.

In case of serious accident to either yacht as hereinafter provided.

TIME LIMIT:
If in any race neither yacht goes over the course in five and a half hours such race shall be resailed.

RACES RESULTING IN A TIE:
A race resulting in a tie shall be resailed.

NEW YORK YACHT CLUB RULES TO GOVERN:
The measurement, scantling and racing rules of the New York Yacht Club, as the same now exist, shall govern the races, except insofar as the same may be inconsistent with the provisions of this agreement.

CABIN FITTINGS:
The main cabin may be fitted for crew's quarters. The term Cabin Fittings shall include wood flooring, skylights, plumbing, upholstery, bedding, partitions, doors, ice box, water tanks and furnishings. If the weight of the cabin fittings of either the challenger or defender shall be appreciably less than seven short tons the deficit in weight shall be compensated for by weight carried on stanchions at a height of about four feet six inches below the deck. The ice box shall have a cubic capacity of not less than forty-five feet and the water tanks shall have an aggregate capacity of not less than four hundred gallons.

ANCHORS AND CABLES:
Each yacht shall carry an anchor weighing not less than four hundred and ninety pounds and a manila cable not less than two and one-half inches in diameter or its equivalent in other rope or chain, the cable to be not less than fifty fathoms in length.

MAINSAILS:
Mainsails shall be jib-headed.

TIME ALLOWANCE:
There shall be no time allowance.

RATING:
Yachts shall not rate over 76 feet.

SELECTING THE CHALLENGING YACHT:
The Challenger shall have the right to substitute another yacht for the yacht named in its challenge, provided that notice of its intention to do so shall be received by the challenged club not less than 60 days before the date of the first race and that such other yacht shall in all respects comply with the terms of these conditions and that her Custom House registry be forwarded with the notice of substitution.

SELECTING THE DEFENDING YACHT:
At least one week before the first race the Challenger shall be informed of the yacht selected to defend the Cup.

ACCIDENTS:
In case a serious accident occurs to either yacht prior to the preparatory signal, she shall have such time, not exceeding in any event four weeks, as the committees representing the two Clubs shall determine to be reasonable to effect repairs before being required to start, or if such accident occur during a race, before being required to start in the next race; but no such allowance of time to repair shall permit of any race being sailed after October 31, 1934.

(*Continued on page 106*)

Will it work? This queer looking 15-foot craft, with a wedge-shaped hull, was seen on Buzzards Bay last summer. In the accompanying letter her designer tells something of the theory on which he is experimenting. Although he makes no claim to speed, we hear from outside sources that she has proved a fast sailer

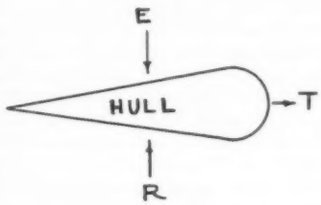
Letters and Correspondence

Something New

Editor, YACHTING:

REPLYING to your inquiry, the boat referred to is named the *Oy-A* (pronounced *Oh Yeah?*). She is an experiment on original lines. I am not prepared to give a final report since she is still in the process of adjustment and tryout and progress is slow because I am limited to week-ends. And if you would be good enough to remember that I have no knowledge of naval architecture other than an imperfect understanding of the article on that subject in the *Encyclopedia Britannica* you will be indulgent of any unprofessional phrasing. I have simply sailed a boat a bit and that nearly thirty years ago.

The basic principle in the design of the *Oy-A* is an attempt to utilize that portion of the wind-sail effort which produces leeway and which is ordinarily counteracted by a lateral plane in the form of a keel or centerboard. To do this I am using a wedge-shaped hull to obtain a forward thrust; thus



I have built a 15-foot working model and the result is rather an odd-looking craft. Her bow is rounded; her greatest beam very far forward; the cockpit is before the mast; her stern tapers to a plank-on-edge; her entry (when in light ballast) approaches a horizontal plane; she leaves the water from a perpendicular plane; she has very little initial stability; but her relatively high freeboard and rounded body forward gives her ample stability when heeling. All her ballast at present is inboard. I have varied the amount from three hundred to eleven hundred pounds of lead; also moved my center of gravity forward and back, changing at will my lateral plane so that I can obtain either a weather or lee helm with the same sail plan. When I get the ballast adjusted most of it will go outside. The sail plan at present is a conventional jib and mainsail. But I also have a topmast that is nearly as long as my mast and which runs up on the latter by means of a sail track and a couple of rings aloft. The mainmast has a permanent backstay running to an elevated sternpost. The topmast has an adjustable backstay running to the same post. All this is for my "kite." Later, I shall send you some pictures of the "kite" in action.

Now for the sailing qualities as far as I have gone. Without any sail, the boat will get underway and tend to work to windward. She does not pay off as does the ordinary hull. With the jib alone, she will work to windward quite nicely. In light air she is very fast. In a stronger wind, she spills the wind as she heels over, and is not so good. This can be helped by increasing her stability. Putting her lead below will do a lot, but I also would like to experiment with some pontoons. She appears to be seaworthy. I have had her out in Buzzards Bay on a couple of days that were rather nasty. The rounded bow puts her maximum above-water buoyancy well forward and she rides the waves much like the breast of a gull. Pounding is minimized. She holds a very steady course.

Now for some of the bad qualities. She does not come about at all well. In fact, in rough water she won't come about at all, and I have to jibe her. Too much wind resistance forward; not enough lateral plane in front of her center of gravity. Another fault is the lack of initial stability. I knew she wouldn't have much, but I didn't expect her to be quite so "crank." Another quality — I don't know whether to call it good or bad — is that as she heels over she changes her course in conformity with the direction of her new water lines, which at all angles of heel are of nearly the same shape; that is, as she heels over she pays off, and as she straightens out, she heads up. I made use of this quality one day when the rudder became unhung. I was a bit over a mile from my mooring. There was a moderate beam wind, and by changing the angle of heel with the weight of my body, that is, by standing in the middle of the cockpit with feet well apart and swaying from one foot to the other, I was able to steer her home and pick up my mooring without any rudder whatever.

EDWARD W. HERMAN

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Further Light on "Dorade's" Speed

To the Editor:

I NOTE with considerable alarm the paragraph on page 63 of the January issue of YACHTING in which you quote Olin Stephens as calling "impossible" my statement that *Dorade* went 8.5 knots three points from the wind during a squall. Now, Mr. Editor, I am very proud to be able to call Olin Stephens a friend of mine, and I like him a lot — but he has one fault: he's too unassuming and modest about what his boats can do. And this fact is at the root of the whole misunderstanding.

Mr. Editor, my hailing port is Boston, which is, as you know, a notoriously conservative city. Furthermore, I have a generous share of Yankee blood in my veins, and we "daown-easters" are famous for our proclivity for understatement. I was brought up by parents who had the unpleasant habit of washing out their children's mouths with Ivory soap when they told fibs. Finally, for years I have been endeavoring to build up a reputation for veracity; and so moderate have all my statements been, that I have succeeded in making my friends actually *believe* me when I tell them how long I took to sail from Thatcher's to Monhegan, or why I lost the race.

But now, Mr. Editor, *now* Stephens' deprecatory attitude towards the boats he has designed, combined with a few drops of your printer's ink, have dissipated, overturned and completely nullified the result of my environment, heredity, and deliberate conscious effort. I think you'll admit that's a bad situation for any man to be in.

I must, therefore, endeavor to clear up any misunderstanding which may have arisen. I did *not* say that *Dorade* went 8.5 knots all the way across the Atlantic. I *did* say that she went at that speed three points from the wind at one time during a heavy squall. I wrote this when I came off watch a few minutes after the incident occurred, in the journal which I was keeping purely for my own edification. I remember I was on deck alone at the time. I say we were going 8.5 knots because the Kenyon Knotmeter registered that speed. I know we were three points from the wind (or thereabouts) because the luff of the mainsail, which was sheeted in flat, was lifting so that only the after half of the sail was drawing. I know that it was a heavy squall because it was physically painful, if not impossible, to face the wind.

There is my story, Mr. Editor, and I'm willing to shiver my timbers or make any other oath you may require.

ALBERT PRATT

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A Letter from England

Editor, "YACHTING":

RAMBLING from one port to another in these Islands, as I do in most seasons, has made it plain that American yachting journals are read avidly by yachtsmen on this side of the Atlantic, and with an open-mindedness, amounting to deference, that would no doubt as much surprise as it would gratify the contributors.

There lives no devout lover of ships and the sea who does not feed on whatever may nourish the passion; that goes without saying. But what seems to me, over here, the peculiar service of your work over there is the knack and air generally of emphasizing yachting's many-sidedness. As the sea is vast, so might yachting be a sport, a living, a way of life, as wide and as various in grade, as multitudinous in possibilities, as infinite in promise as the sea itself. But it takes a man, relying on his own observation, some time to find this out. What he wants is to have his imagination stirred. This most of us can best do by reading. Yet over here, with possibly a single exception, the hungry cry out and are not fed.

It must both bewilder and amuse visiting yachtsmen to see the way in which yachting news and events are treated, or not treated, in the British press. The explanation lies in a cause a good way back in time — as is the way with most English things. Popularly, yachts and yachting connote Cowes and the Royal Yacht Squadron. For more than a hundred years the annual four-day regatta of this historic club has been the occasion for a great and brilliant social gathering. Hence Cowes Week. The popular papers exhaust themselves over this one event; and though in their treatment yachts provide only the atmosphere and background for personages, it is thereafter assumed that the public has had enough of yachts and yachting until another Cowes Week comes around.

I must now attempt to account for a disturbing by-product of the above. Membership in the R. Y. S. is deemed to confer such preëminence that it appears to be assumed that the activities of such should be accorded especial prominence. Thus the bulk of yachting news and comment consists of what in more senses than one is "big class stuff." In our yachting news, therefore, the achievements and activities of smaller boats, unless their owners are persons of considerable social distinction, are squeezed in at the tail-end or left out altogether.

There remains (as I see it) one other factor which affects considerably the proportions as well as the presentation of British yachting news, as printed. Small as are these islands, yachting folk, like other interests, tend to coalesce into coteries and cliques. For all their intercourse and for all the sympathetic interest each expresses in the other, the Solent and the Clyde, the East Coast of England and the West, might be severally situated in different continents. Nevertheless, because it is socially the most favored, the Solent receives the almost exclusive attention of the press.

I don't know that all this can bother yachting men, who can get along without publicity; indeed, it is one of the things we go to sea to escape. But what I am anxious about — and that is why I venture this letter — is that yachtsmen who pay us the compliment of visiting these shores should not leave them with the impression that British yachtsmen are as parochial or as snobbish as our papers represent us to be.

And yet, with personal meetings so few and fleeting, and those in uncharacteristic surroundings — in recent years have the Stars-and-Stripes been seen on our youthful and happy-go-lucky East Coast? — how shall you judge us save by our sycophantic yachting papers and bickering letters about "ocean racing"?

Let me cite an example. Provoked no doubt by those tedious letters or niggardly articles about the Fastnet Race, the editorial page of YACHTING contained in September a paragraph which must have made some of us over here flush with embarrassment. Regarding the rumor that the Fastnet contests might be discontinued, YACHTING comments that, if this occurred, "it would be a sorry day for yachting in Great Britain."

Now I submit, with all respect for the Fastnet's importance in its special line, and with all deference to editorial opinion, that this is a typical instance of mistaking the much-talked-of thing for the essential. If the Fastnet Race was never heard of again British yachting would not notice the difference. Let us get this clear. The Fastnet event derives its main interest, not from the fact that it is in some years an extremely arduous contest, but from the fact that other countries pay us, its originators, the compliment of participating. And thus it becomes us, as the hosts, to ensure good company and good sport.

It chanced this year, however, that British entrants were deplorably few; and that must have seemed ungracious in us. It may have been possible for the Royal Ocean Racing Club to have whipped up a bigger and more representative fleet from among its own members, or it may not — the present writer does not know. What he does know is that, for causes it would be superfluous to enumerate, our *young men* have not the boats in which to sail the Fastnet course without appearing ridiculous.

In this country (which, after all, is so small compared with your own) there is missing a whole generation. In a day's walk you would remark how scarce seem the men who should be within the ages, say, of 38 and 50. You will remember why this is so, and you will remember that these would have been the men to supply the prime yachtsmen. Our young men must perforce stick closer to desk and factory and shop than young Englishmen of the yachtsman class have ever had to do before, while the older men find no attraction in ocean racing. At least, they show no enthusiasm for the Fastnet course. They do,though, race around the regatta courses, and this they do, septuagenarians though they be, unweariedly.

Our young men, nine out of ten, or an even larger proportion, do their sailing in small cruisers. The racers, a minute proportion of the whole, do their racing in the smaller one-designs. And I know this is so in your country. Your papers tell us so. But from our papers, you could not conclude that we are now a country where small-boat sailing (which here nine times out of ten means cruising) is become a passion that burns steadier and stronger than it ever did. Overmuch concerned with *Britannia*, the Royal Yacht Squadron, and the Fastnet Race, our papers overlook this. It is the truth, all the same.

But I must clew up and furl, concluding an overlong letter with the message that our yachting is more like the game as you play it than you may have been led to suppose. I hope that when next you do us the honor of sending over some ocean racers, some spot less bleak than the Fastnet Rock will be selected as your objective.

JOHN SCOTT HUGHES

BOOKS FOR THE YACHTSMAN

The Log of a Limejuicer

By

James P. Barker

(*Huntington Press, 1933, $2.50*)

DURING a period in which we are being flooded with books of the sea, it is refreshing to find in the "Log of a Limejuicer" a story of life under canvas that is completely satisfying to one who really knows the sea and seamen. This is so because the story of Captain Barker's life is told not only by one who has followed the sea for forty-four years, but who talks as a seaman talks and has made no compromises for the sake of style. And yet the writing has style — the style of an eventful tale simply told.

Captain Barker will best be recalled by Americans as the master of the last deep-water ship in active service under the American flag. Until the depression caused the *Tusitala* to be laid up a couple of years ago, Captain Barker made a voyage to Honolulu and return in her every year. For he is one who still loves sail and, although he has served as master in steam, he preferred sail and took a keen satisfaction in keeping alive one of the last of a great fleet which carried the cargoes of the world on every sea.

But this book is not about the *Tusitala*. It is about Captain Barker's earlier life when he was sailing in limejuicers as apprentice, mate, and master. In this service he rounded Cape Horn forty-one times. At the age of twenty-eight he commanded the ship *British Isles*, and the account of a memorable voyage in that ship, when the coal took fire and the young captain had to contend with a recalcitrant mate, of how he carried on around Cape Horn and finally brought his ship safely, though damaged, to a Chilean nitrate port, is an epic of the sea that will stir even a hardened seaman.

There are other stories, all connected with Captain Barker's seafaring experiences under the Red Duster, and all good. The tale loses none of its vitality or freshness by being told by Roland Barker, Captain Barker's son. The story and the language are those of the "Old Man" himself. It is a book to recommend.

HERBERT L. STONE

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Week-End Yachting

By

Francis B. Cooke

(*Longmans, Green & Company, New York, $5.00*)

EVEN the most confirmed addict of pleasures ashore can hardly be immune to this inspired guide addressed to amateur and would-be owners of small yachts, for it is pretty sure to implant an urge that can be satisfied only by following in the wake of the author. For Mr. Cooke, by his informative enthusiasm for a sport which has held his interest for forty years, proves it an adventure so inexpensive, so fascinating, and withal so easily undertaken as to be virtually irresistible.

Beginning wisely with the question of finance, which nowadays is the paramount consideration governing every project, a clean-cut estimate is given of the costs involved in the purchase, upkeep, and personal outlay attached to a five-tonner (without auxiliary engine) to be used at week-ends throughout the regular season and for an annual summer cruise. Expenses are scrupulously analyzed and tabulated and the sum total, as shared by two persons, certainly "talks" favorably on the side of owning such a boat.

This same practical consideration of a subject in its every aspect and detail is manifested throughout the book whether the discussion deals with building, fitting out, or insuring a yacht, or choosing for her a suitable anchorage. Even the less technical chapters concerned with such supplementary ideas as sailing partners and guests, cabin comfort, and catering, which are seasoned with the pungent humor one learns to expect of Mr. Cooke, do not lack the strict treatment always accorded by his methodical mind.

In the learning of seamanship, the amateur sailor is referred to the good old school of experience. But if one would read for knowledge, several books are cited as excellent sources of help, the classic work *Down Channel* by the great R. T. McMullen, in particular. However, out of the rich fund of his experience, Mr. Cooke solves for his reader numerous problems in elementary navigation for both handy and unhandy craft in all weathers, tides, and situations, from getting underway in a crowded harbor to picking up moorings while running with wind and tide. One interesting chapter is devoted to the delights and responsibilities of sailing alone.

There is a glossary of the more common nautical terms at the end of the book and ten folding plates illustrating the lines and accommodations of five types of small yachts for week-ending. Some of these have been standardized for quantity production by two of England's finest shipwrights, while the design of one, *Englyn*, was especially prepared for the book by Dr. T. Harrison Butler who is the designer also of *Cyclone 2* and *Yonne, Englyn's* popular predecessors.

In a word, "Week-End Yachting," is a library of tried-and-true information about the acquisition, upkeep, and management of small craft that is certain to lure more than one landlubber from the countryside and sustain the right hand of many an amateur navigator in distress.

M. TODAHL

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Voyage and Discovery

By

Conor O'Brien

(*William Blackwood & Sons, Ltd., Edinburgh & London, 12/6*)

WHEN two enthusiastic yachtsmen, both artists, leave England behind for Mediterranean waters and "a holiday in the sun," something notable is sure to come of it. Especially when they believe that "the business of yachts is to discover islands" and their ship happens to be one like *Saoirse*. Not so many years ago, Conor O'Brien sailed around the world alone in this 42-foot ketch, his maiden attempt at ship design; now, joined by his wife, his tale is one of more leisurely hours, of "a kind of yachting which we had forgotten the existence of."

Saoirse was rerigged as nearly like a brigantine as her structural peculiarities would permit. Then, at her first port of call, Gibraltar, where she was refitted, the skipper tried out another

of his theories by abolishing the hated main boom and, after cutting it into halves, building of these an outrigger to which to sheet the sail. Despite the still heavy sails and complicated gear, this partial reversion to the former type of rig rendered navigation so much easier for two hands that a third became optional.

It was just outside the Straits, and shortly after a two-day gale had slackened her run down the coast, that *Saoirse* encountered her first experience with the dread Levanter of the Mediterranean. In the days ahead the ship was to struggle more than once with this peculiarly devilish manifestation of Nature's crankiness. But if Spanish waters evidenced inhospitality, not so the land. "More than any other country," says Mr. O'Brien, "is Spain considerate of visiting yachtsmen."

From Gibraltar, the cosmopolitan, the travelers proceeded to Malaga, with its exquisite sixteenth century cathedral, and thence to gray and quiet Cartagena whose beautiful natural harbor, alive with sailing vessels, is beloved by explorer and artist alike. Then a few days at enchanted Alicante and so to Iviza in the Balearic Islands.

Iviza turned out to be "like the place good yachts ultimately go to after their labours." And like the owner of the French yacht near which *Saoirse* found a berth, the voyagers tied up for only a week, and remained for more than a year. The economy of their new situation exerted a modicum of influence, to be sure. But aside from that, the perfect harbor, with its secure moorings, the welcoming Club Nautico, the conveniences — among them electric light aboard ship — the quaint *al fresco* shops, the engaging habits of the country, all combined to hold the visitors with the charm of life as it is happily lived among a simple people.

Mr. O'Brien, a former architect, writes with a burning perception for beauty, whether of nature or that created by the imagination and hand of man. If, as is claimed, beauty is in the eye of the beholder, then he is surely blessed with inspired vision. In Katharine Clausen, who contributes to the book a series of distinguished illustrations, he finds a worthy shipmate for a voyage devoted to the discovery of rumored loveliness, as well as poetic islands. We hope this may be only the beginning of their Odyssey.

M. Todahl

Knots Useful and Ornamental

By

George Russell Shaw

(*Houghton Mifflin Company, Boston & N. Y., $4.00*)

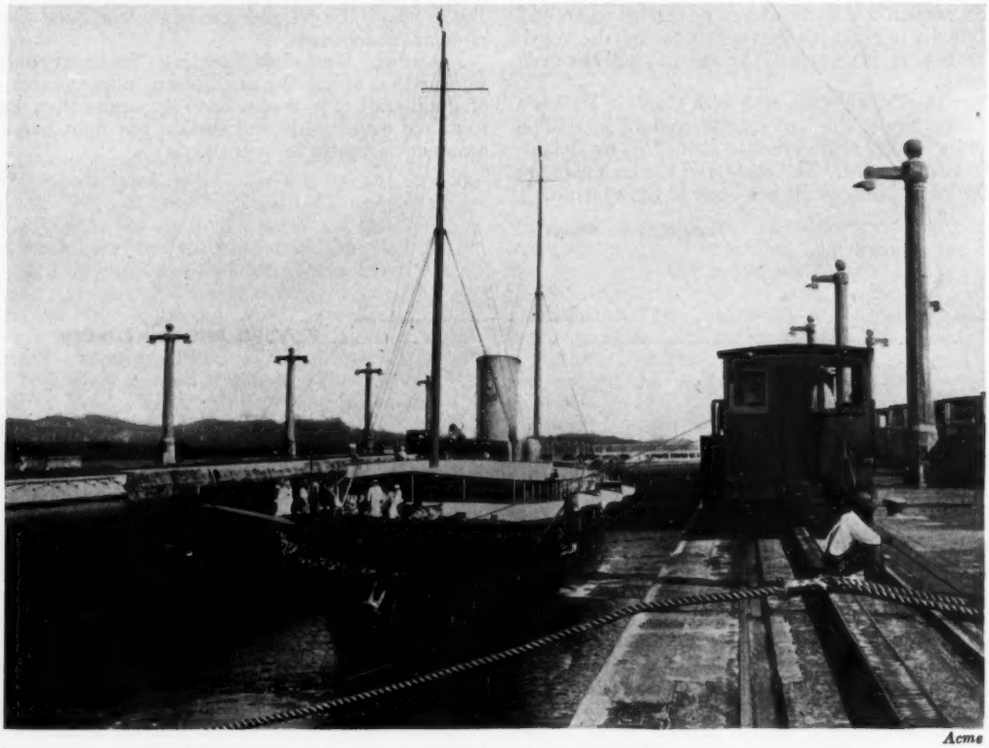
ILLUSTRATIVE of the beautiful as well as practical results attained by man's dexterity with the most commonplace materials is this book of knots, wherein the seaman vies with the cowboy and the rug weaver for ingenuity of craft. It seems that here are all the known knots in the world, some of which, we are told, have never before been explained. But this excellent handbook with its neatly drawn diagrams shows exactly how to tie them all.

Among the sailors' knots, of which there are a great number, may be mentioned the Midshipman's Hitch, the Fisherman's Hitch, the Capstan Knot, the Sheet Bend Toggle, Serving and Splicing, the Clove Hitch, the Half Hitch, and the Turk's Head. Nor are fishermen's nets and anglers' knots forgotten, especial attention being paid to the tying of artificial flies: a fish hook, a length of colored silk, a hackle from the neck of a cock, a few twists, a drop of varnish to boot — and lo! the deed is done.

Then there are the Knots of the Ranch and the Farm: Halters, Manger Knots, Hackamore Ties, Sack Knots, Slings, and many more. The names alone proclaim how important a knowledge of the artifices is to the man who would pursue the life of which they form an essential part.

The Hangman's Noose, the Four-In-Hand Tie, and the Shoestring Knot find their allotted places as does the mystifying Diamond Tie that graces the lowly package. Among the Ornamental Knots and their related designs, the Celtic motifs showing a strong ecclesiastical influence are interesting and the Chinese Temple decorations likewise. But perhaps the most striking feature of all are the Japanese Knots suggesting the outlines of natural forms.

Last but not least, the manuscript writing in which the entire text is couched completes a book that will be an item of artistic integrity as well as of absorbing interest for your shelves.



Acme

J. P. Morgan's "Corsair" at Gatun Lock in the Panama Canal on her recent passage from the Atlantic to the Pacific

Under the Lee of the Longboat

by Cap Stan

THE situation regarding the "International Twelve-Metre Cup," offered two or more years ago by the North American Yacht Racing Union, seems to be a bit involved, according to editorial comment in our British contemporary, the *Yachting World*. The Britons believed that the cup should have been raced for in 1933, either in British or Scandinavian waters, inasmuch as those countries are undeniably leaders in Twelve-Metre racing. But we did not agree with that idea, and wanted them to come over here and race in the initial contest, which they did not do. But this year they were willing to come over, and so was Norway, but our reply was: "Sorry, we have no boat to meet you with." So there will be no race for the cup in 1934. Which brings this suggestion from the *Yachting World:* "If the suggested International Regatta in British waters is arranged for 1935, that would be the most suitable occasion to hold the first races for the Cup. We commend this proposal to American yachtsmen." Plainly, the Britishers have put us on the defensive. It's time we did something definite about it, or call the whole thing off.

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The resurrection of the catamaran, and the advent of a new kind of "sailplane," very possibly means the development of a new type of craft for racing. Many racing yachtsmen, out for the thrill of pure speed, and speed alone, are tired of sailing around triangular courses in comparatively heavy, logy craft, with a maximum speed of some 8 to 10 knots. Your catamaran, or sailplane, will go twice as fast. What does it matter if they're not particularly seaworthy? They're for summer sailing, in protected waters, and are not meant for Transatlantic racing. And they should be very moderate in cost, and provide a real kick. Don't be surprised if you see quite a few of them cavorting around before the end of the coming season.

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Judged by comment received from various quarters, my definition of a "motor sailer" seems to be the best yet offered. A gentleman from Philadelphia writes: "You certainly drew a watertight line between the motor sailer and the auxiliary. I've been trying to find a flaw in it ever since reading your article, but must confess I have had no luck at all. . . . As soon as you get a motor sailer which will really sail it is no longer a motor sailer, but an auxiliary." Seems like a pretty one-sided argument so far. Rather tough, when you're looking for a scrap and can't locate one.

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While the Motor Boat Show lived up to all predictions — "bigger and better in every way" — the outstanding feature which lingers in my mind was the genuine optimism met with on every hand. The usual "hooey" about sales was almost totally absent — exhibitors who really made sales weren't bragging about them, but, rather, were reticent in telling about them. But everyone was happy both over sales and prospects for future sales. No one seemed to be talking about depressions — they were talking about a boom in business — their business. And their optimism was genuine, not forced sales talk. "Sure, we've turned the corner," was heard more than once, with few, if any, dissenters. It certainly looks as though we were in for a good year, after surviving several pretty sad ones.

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From the very beginning of Frostbiting, dire predictions were made to the effect that mild winters wouldn't roll around every year, and that a bad winter was due, which would put a complete quietus on the game. Well, the bad winter is here. Every harbor between Boston and New York is frozen up, and frozen tight. Larchmont had to call off its Midwinter Sanctioned Regatta, and so on. So what? Simply that the Frostbiters are champing at the bit, waiting impatiently for the ice to melt so they can continue dinghy sailing and racing. Two ambitious Frostbiters even built small ice boats, rigged them up with dinghy sails, and had a grand time sizzling around Larchmont Harbor. No, a little ice isn't enough to discourage the Frostbiters. They're waiting watchfully for a chance to get afloat, setting dates for more sanctioned regattas, and even forming plans for an enlarged spring and summer season. Frostbite Regattas in winter, Sunburn Regattas in summer. Let's go!

A Rugged Auxiliary Cruising Ketch

THE plans on this and the following page, of a rugged auxiliary cruising ketch, are from the board of Sparkman & Stephens, of 11 East 44th Street, New York, and were drawn to suit the particular requirements of Mr. R. S. Kellogg, who expects to have the boat built for the coming season. Following are the principal dimensions: l.o.a. 38′ 6″; l.w.l. 32′ 3″; beam, 11′ 3″; draft, 5′ 4″; sail area, 691 sq. ft.; outside lead ballast, 9500 lbs.

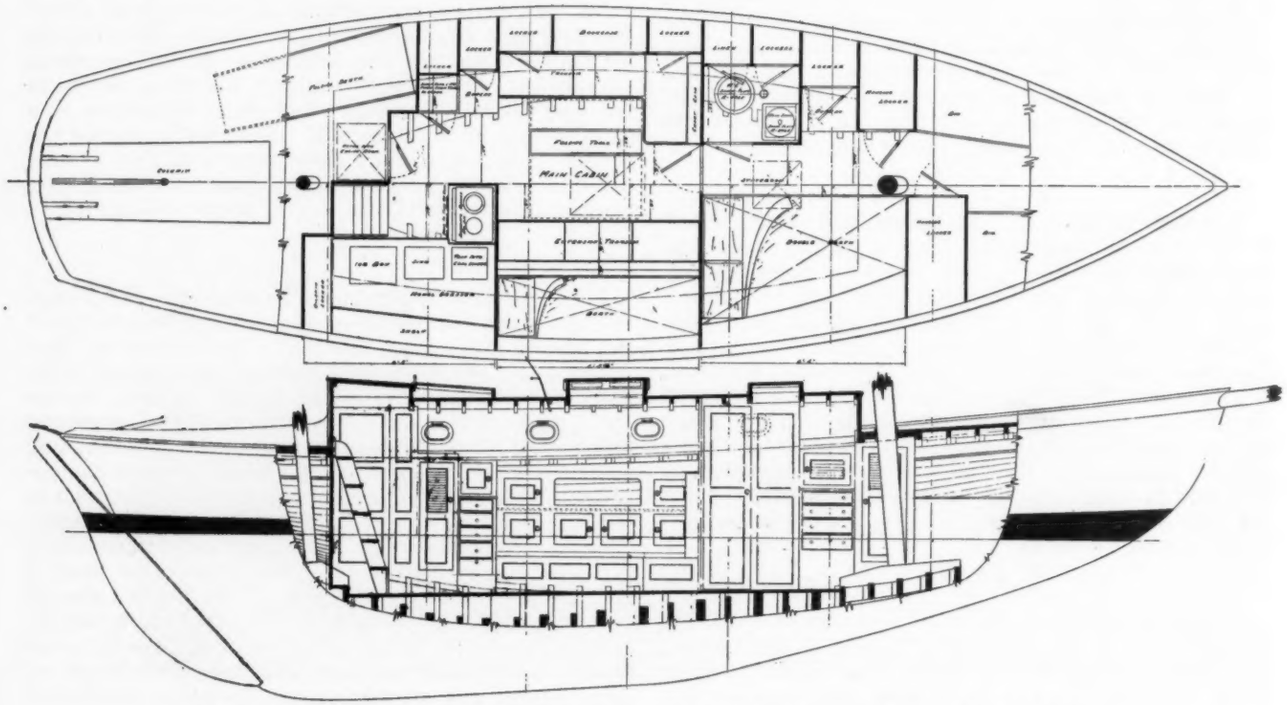
The purpose behind the design was to produce a roomy and able small cruiser, easy to handle on extended cruises when the owner and his wife were the entire crew. This is one reason why the handy ketch rig was divided into small units, and why it is so stayed that the runners will seldom be needed. When the runners are set up, they are far enough forward so that the leeward runner can be left set up when tacking.

Sail plan

As the plans show, the hull is of the short-ended, husky type, with outboard rudder well raked. The beam and firm sections indicate fine stability, while the fore and aft lines are easy and sweeping, so that the hull should be quite easy to drive. The raking keel augurs well for good windward qualities, the draft having been held down to the maximum limit set by the owner.

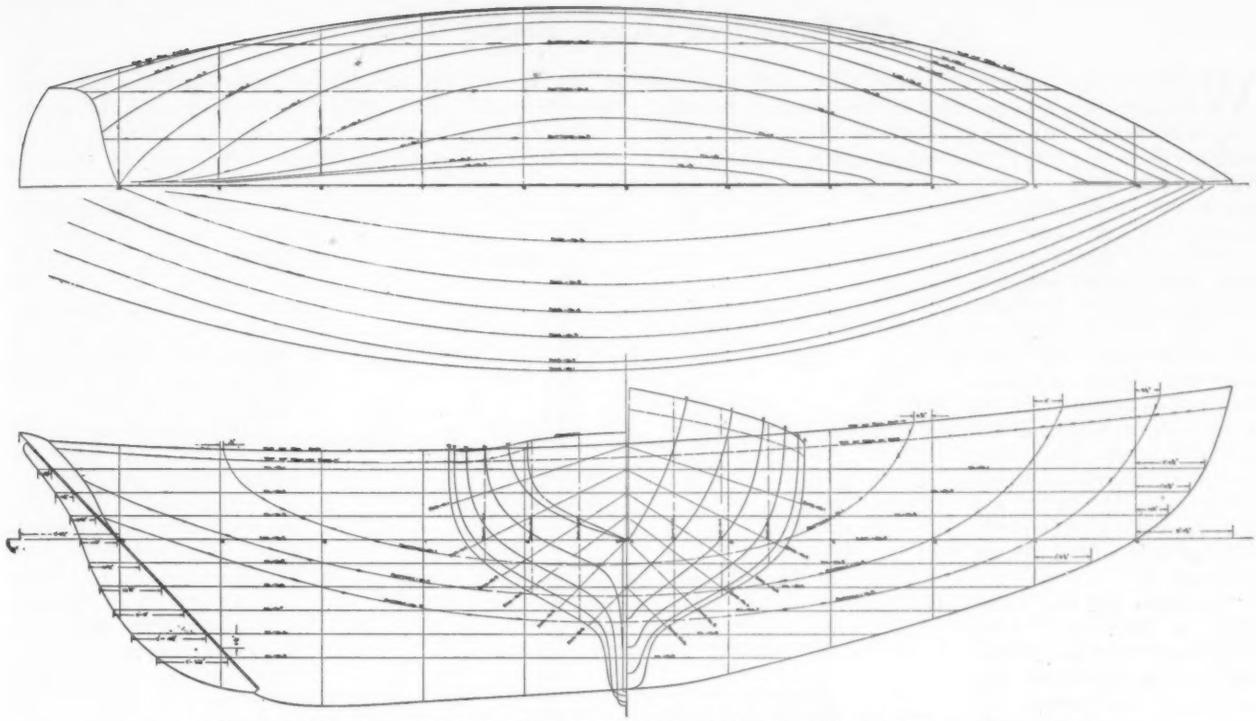
The interior layout is quite unusual, and reflects the definite ideas of the owner. There is a large stateroom forward, with double berth, and toilet room opposite. The amidships main cabin has a built-in berth and extension transom to starboard, while opposite is a transom, chart case and table, lockers, book case, etc. The big galley is at the foot of the companion steps, to starboard, with ice box, dresser, and coal stove installed athwartships. Opposite is a bureau, lockers, etc.

The motor, not yet chosen, will be under the bridge deck and offset, this installation permitting the mizzen to be stepped on the keel rather than in a tabernacle. There is ample tankage for fuel and water, and an unusual amount of space has been devoted to lockers shelves, bins, etc. The construction details call for a very rugged craft, with weighty materials where needed, and sturdy bronze hull strapping.



Cabin plan and inboard profile of the 38-foot ketch designed by Sparkman & Stephens for R. S. Kellogg

The plans reproduced in this section are the property of the designers under whose name they appear. Further information concerning any design should be addressed direct to the naval architect in question.

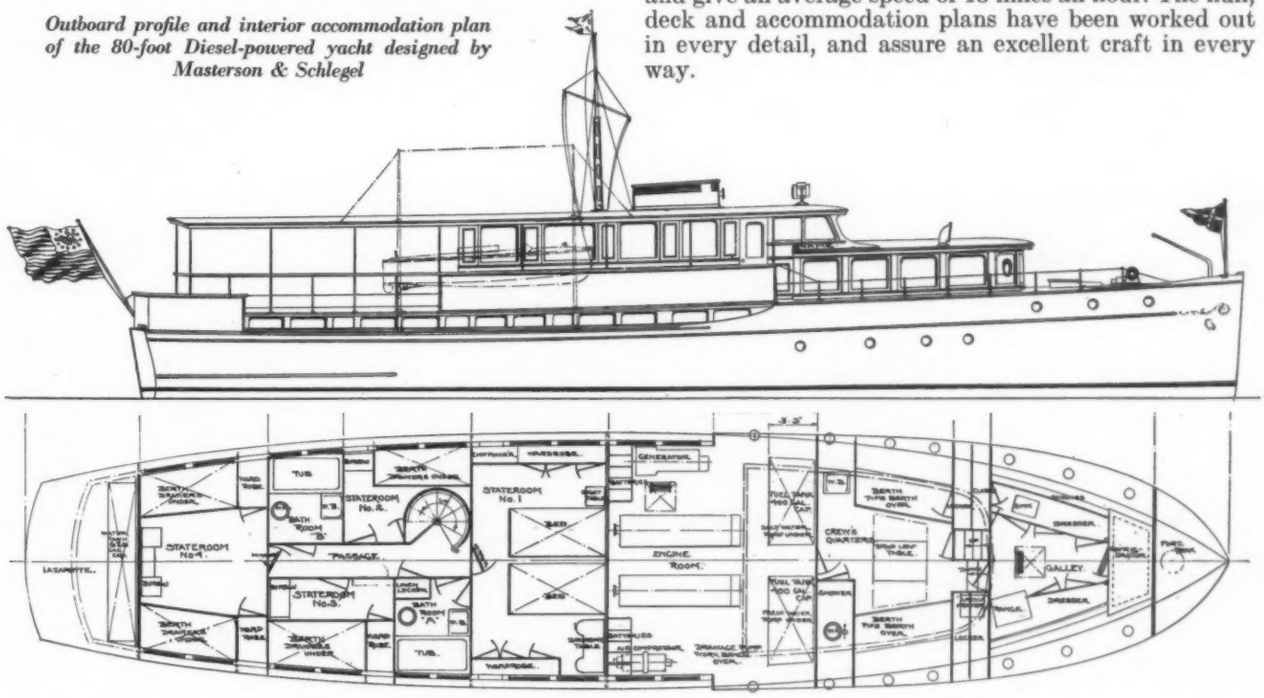


Lines and body plan of the ketch designed by Sparkman & Stephens, described on preceding page

A Commodious Twin Screw Diesel Yacht

THE handsome twin screw Diesel-powered yacht whose plans are shown below was designed by J. E. Schlegel, of Masterson & Schlegel, 51 East 42nd Street, New York, and is similar in design to other successful craft of the same size and type produced by Mr. Schlegel. Besides her up-to-dateness in all details, the two outstanding features of this craft are the unusually fine accommodations and low operating cost. The plans show her roominess better than any word picture could. It is claimed that she needs a crew of but four men to run her, while her two Winton-Diesel motors are remarkably economical in fuel consumption and upkeep, and give an average speed of 13 miles an hour. The hull, deck and accommodation plans have been worked out in every detail, and assure an excellent craft in every way.

Outboard profile and interior accommodation plan of the 80-foot Diesel-powered yacht designed by Masterson & Schlegel



An Attractive Ocean Racing Yawl

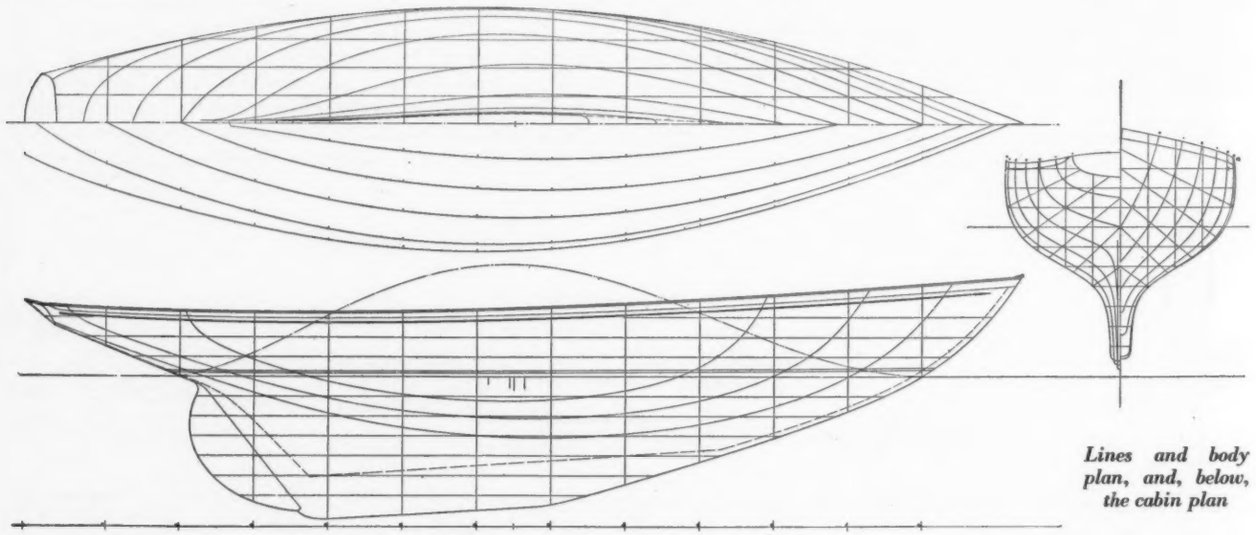
WITH ocean racing an established and popular branch of yachting, any craft designed particularly with this end in view is sure to be of interest to blue water sailors in general, and ocean racers in particular. Such is the design pictured herewith. This trim jib-headed yawl, from the board of Philip L. Rhodes, of 103 Park Ave., New York, is not only sightly, with few radical features, but has been designed to rate well under any measurement rule which is at all favorable to a wholesome, fast and seaworthy boat. Following are the principal dimensions: l.o.a. 63′ 4″; l.w.l. 47′; beam, 14′ 6″; draft, 9′; sail area, four lowers, 1843 sq. ft.

The lines and body plan show a boat with good beam and firm bilge, sweeping fore-and-aft lines, and moderate overhangs, besides good freeboard, though the sheer seems a bit flat. There is plenty of power indicated in the sections, easy entrance and exit, with the forward part of the keel raking for efficient windward qualities, and the after end straight to facilitate docking and hauling out.

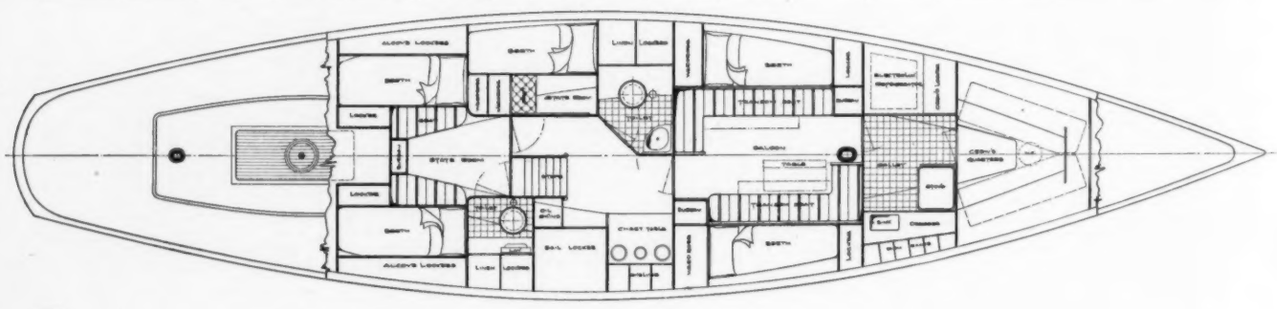
The jib-headed yawl rig, with small mizzen, is unquestionably one of the fastest which can be devised, with rig allowance a consideration. The rather large mainsail is a wonderfully efficient driving sail, aided and abetted by well-designed headsails, while the mizzen is more or less of a balancing sail, handy for bad weather, or when a reefed mainsail is in order.

The layout below decks is excellent, not only for ocean racing, but for ordinary cruising as well. The crew's forecastle, with toilet, is followed by a good athwartships galley. Then comes the main saloon, with two berths, transoms, lockers, bureau, etc. Abreast the companion steps are a navigator's department, sail locker, toilet room, etc. A double and single stateroom, and a second toilet room, complete an excellent interior layout for racing or cruising.

Sail plan



Lines and body plan, and, below, the cabin plan



A Shoal Draft "Tabloid" Cruiser

FOR the many people who demand a small, inexpensive auxiliary in localities where shoal draft is an absolute necessity, the design of the little auxiliary shown on this page merits consideration. Designed by Geerd N. Hendel, of Boothbay Harbor, Maine, she is of the following dimensions: l.o.a. 25′; l.w.l. 22′ 6″; beam, 8′; draft, without board, 2′; draft, board down, 4′ 6″; sail area, 327 sq. ft.

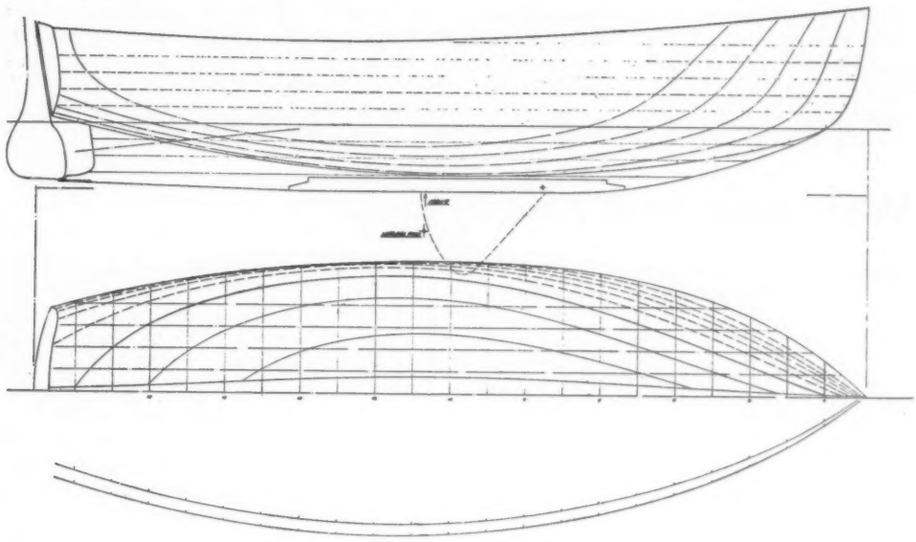
The outboard profile shows a short-ended, rather "chunky" craft, with short ends, jib-headed sloop rig, with mast through the cabin trunk. The water lines and buttocks are quite easy and sweeping for a short, chunky boat, and the bilges decidedly firm, denoting good natural stability. While she is a full-bodied craft, both entrance and exit are good. The small centerboard will help when going to windward, though her best sailing will doubtless be done with free sheets.

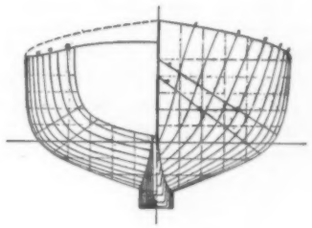
While the motor is not specified, there is sufficient space under the bridge deck for a "get-atable" installation of either a "one-lunger" of the 2-cycle variety, which many prefer for small craft, or one of the several light, compact and efficient 2-cylinder, 4-cycle motors now available at a low figure. The motor should come in handy when beating to windward in rough going, where so small a craft is at quite a disadvantage under sail alone.

Sail plan

The interior layout shows the galley aft to port, abreast the companion steps, with a seat, locker, and stowage space opposite. The main cabin has two transoms, with drop leaf table on the centerboard trunk. There is a toilet and storage space forward, and a lazarette aft.

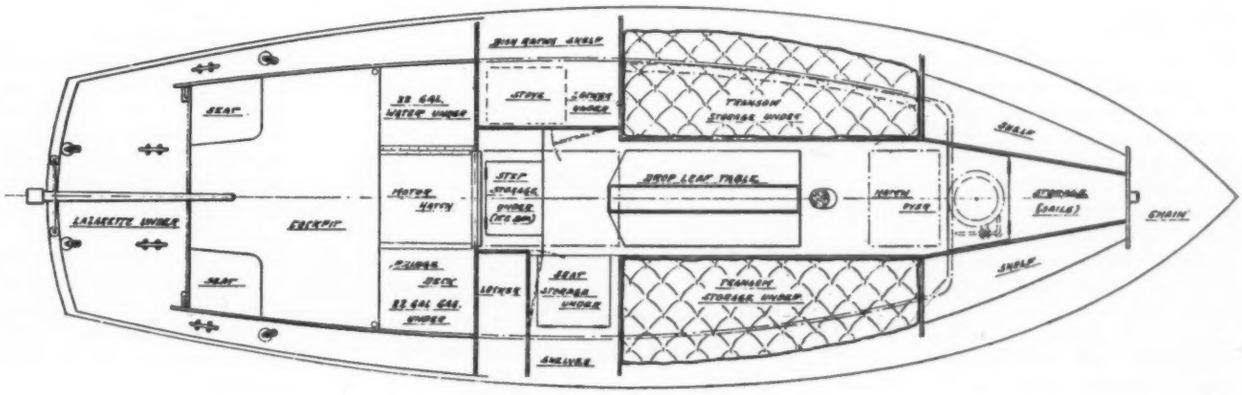
The sloop rig is a "natural" in a boat of this size and type, fast and handy. Unusual room is obtained below decks by extending the cabin trunk well forward, and stepping the mast through the trunk, a tried and proven form of construction.

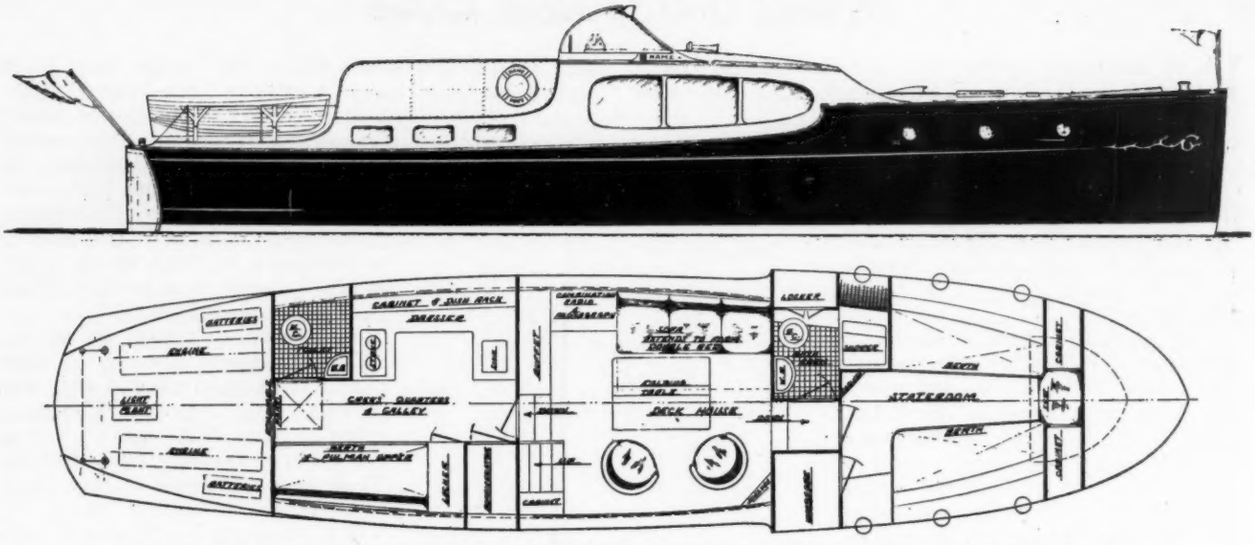




The lines and sections denote good stability and a reasonable turn of speed with started sheets

(Below)
Cabin plan





Outboard profile and interior accommodation plan of the 48-foot day cruiser designed by Henry C. Grebe & Co., Inc.

A Fast Twin-Screw Day Cruiser

THE plans above are from the board of Henry C. Grebe & Co., Inc., of 400 North Michigan Ave., Chicago, and show a 48-foot, twin-screw day cruiser with a number of unusual and interesting features. The interior layout is more or less the reverse of the usual thing, with crew's quarters and galley aft, and owner's quarters forward, this arrangement being made possible through the installation of the twin motors aft, working through gear boxes. The crew's quarters are more or less combined with the galley, and there is a toilet room aft, as well as one forward for the owner and guests.

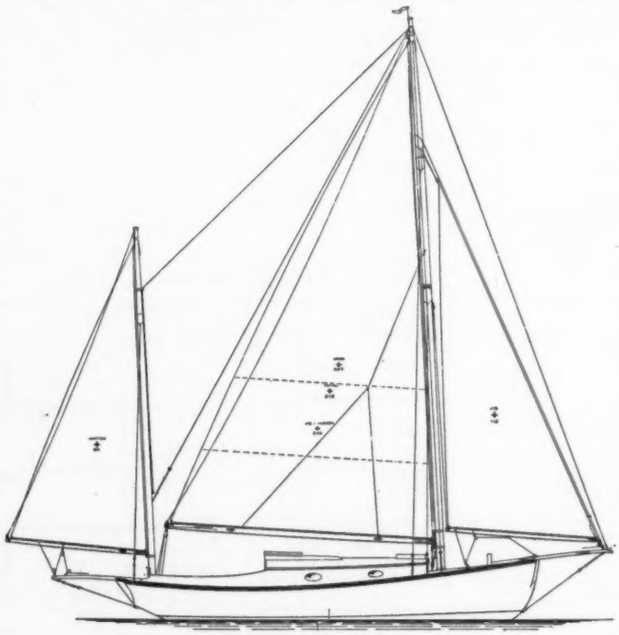
The large deck inclosure is streamlined, and the whole appearance of the craft is distinctly modern. A bow cockpit, added to the spacious bridge deck, gives fine accommodations for large day parties, while there is a good double stateroom forward besides. The dinghy is stowed aft, where it can be easily launched or stowed. Speeds up to 35 miles an hour are indicated.

Alden's Latest Small Auxiliary Cruiser

ON THIS and the following page are the plans of a splendid little auxiliary cruiser from the board of John G. Alden, 131 State Street, Boston. Following are the principal dimensions: l.o.a. 28′ 6″; l.w.l. 23′ 3″; beam, 9′ 8″; draft, 4′ 6″.

The jib-headed yawl rig, with its well-known handiness and driving qualities, is ideal for a craft of this type and dimensions. The displacement being moderate, the 505 square feet sail area is ample for driving her in all weathers, while the division of sails makes shortening down easy and quick. A Gray 4-20 motor, installed in a separate compartment under the bridge deck, will provide silent, dependable power whenever the owner wishes it.

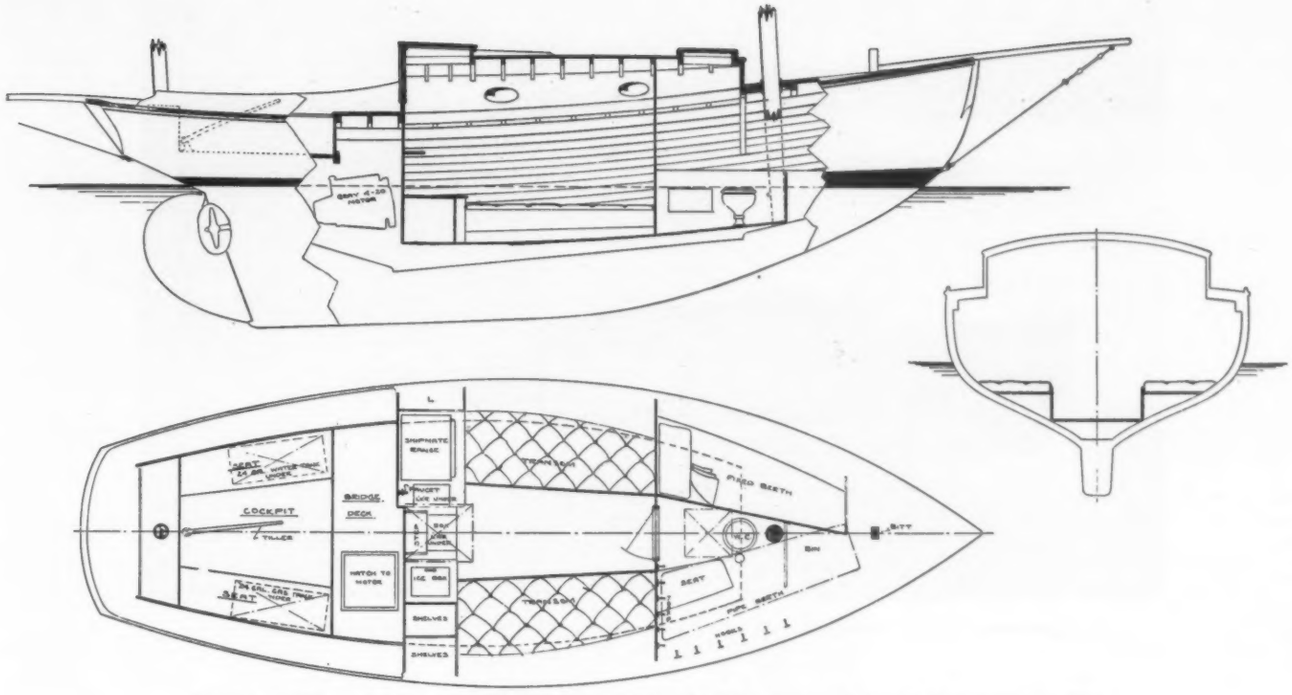
The hull has moderate overhangs and well-lifted ends, a snappy sheer, and plenty of freeboard. The beam is ample, and the sections firm, with easy entrance and exit, so that she should be a good sailer in all conditions. The cockpit is, of course, self-bailing, and quite roomy for so small a boat. And she steers with a tiller, a feature which will appeal to many real sailors, who prefer the "feel" of a tiller to having the "feel" smothered by the mechanism of a steering gear.



Sail plan of the Alden-designed yawl

The galley is aft, there is a good main cabin with two berths, and a forecastle with a fixed berth and pipe berth for an occasional fourth guest. And there is full headroom in the cabin — quite an unusual feature in an auxiliary of this size.

Tanks for water and gasoline are installed under the sides of the cockpit. A hatch in the bridge deck gives access to the separate motor compartment.

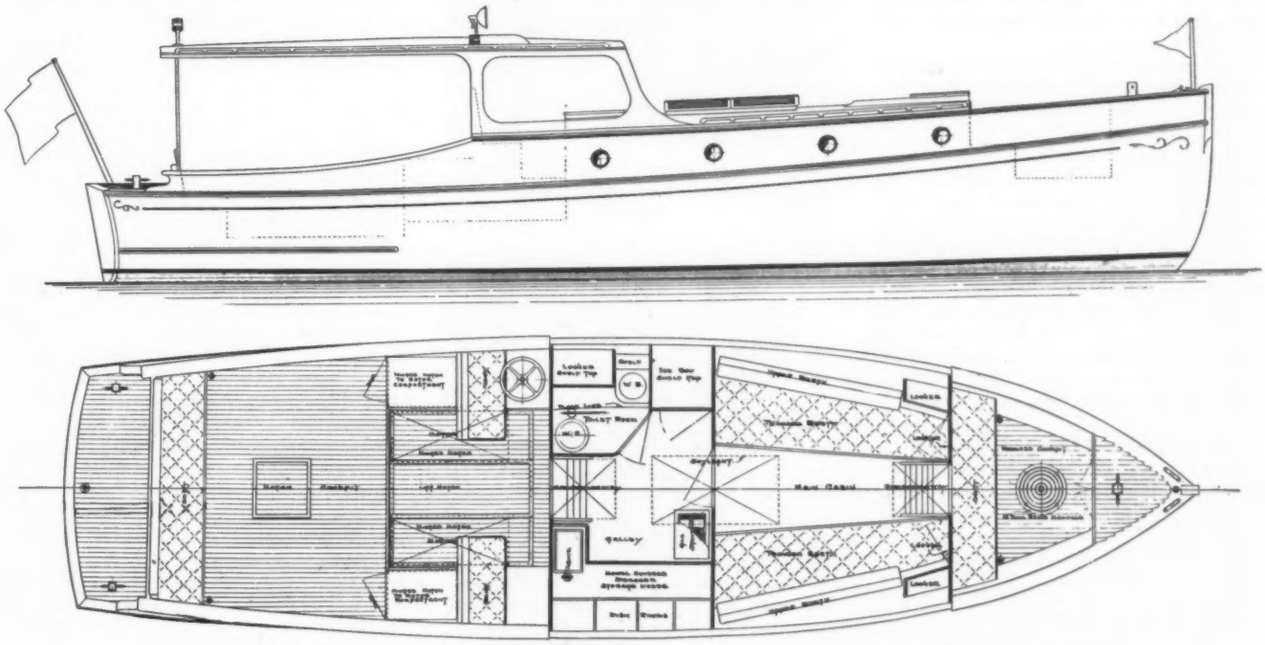


Inboard profile, cabin plan and midship section of the Alden-designed yawl described on preceding page

A Snappy Twin-Screw Day Cruiser

BELOW are plans of an attractive twin-screw 39-foot day cruiser from the board of Winthrop L. Warner, of Middletown, Conn. She is a duplicate hull of *Ailenroc II*, built last year, and has a layout planned to suit a Long Island yachtsman who wanted a comfortable day cruiser, with sleeping accommodations for four, and which could be used to advantage as a tender for a small racing yacht.

In addition to a forward cockpit, there is a spacious after cockpit for day parties and for handling lines and sails from the racing yacht. The comfortable bridge deck is enclosed. Below decks are a fine galley, toilet room, four-berth cabin, and good locker and storage space. Twin 6-cylinder, Model KM-369 Buda motors, with direct drive, are located under the bridge deck, and will provide ample power not only for normal purposes, but for towing as well. It is probable that this craft will be built before the season opens.



Outboard profile and interior accommodation plan of the 39-foot day cruiser designed by Winthrop L. Warner

A handsome 38-foot cruiser designed by John L. Hacker for Charles P. Lyon, of Ogdensburg, N. Y. A 330 h.p. Scripps V-12 gives her a speed of 35 m.p.h.

Of Interest to the Skipper

Michigan Machined-Pitch Propellers, Repair Blocks, and Service Stations

ABOUT two years ago the Michigan Wheel Co., of Grand Rapids, Michigan, announced the development of their patented Helical Planing machine which has made possible the production of accurate and perfectly true machined-pitch propellers. The Michigan Machined-Pitch propellers found immediate and widespread acceptance.

The planing machine and the process by which the machined-pitch propellers are made is described in a small booklet, "More Vital than the Motor or the Hull," which may be obtained by writing to the above address. In addition, this booklet describes how the Michigan Wheel Company carried their new process further by the manufacture of a complete range of "pitch blocks" which are used to set the castings upon to insure perfect accuracy in boring. All readers should be well aware of the fact that inaccuracies in boring, as well as in pitch, design, and wheel balance, are one of the principal causes of propeller vibration and inefficiency.

These pitch blocks have been adapted for use as repair blocks and, as the pitch blocks have the pitch machined on them, they are in themselves master gauges. These pitch blocks are available in a double series, for both right- and left-hand wheels and are made in sizes covering the smallest outboard wheel up to wheels of 36 inches in diameter.

For the convenience of boat owners using Michigan Machined-Pitch wheels, outboard motors, and other standard propellers, the Michigan Wheel Company is establishing propeller service stations at salient points throughout the country. These stations will not only be equipped with the master gauge pitch blocks to repair bent wheels, but they will act as distributors of Michigan Wheels and will be equipped to solve the boat owner's propeller problems. A list of these stations may be secured by writing to the Michigan Wheel Company.

A bent wheel placed alongside a Michigan Machined-Pitch block for straightening

Showing how perfectly a Michigan Machined-Pitch wheel mates with a similar "master gauge" pitch block

+ + +

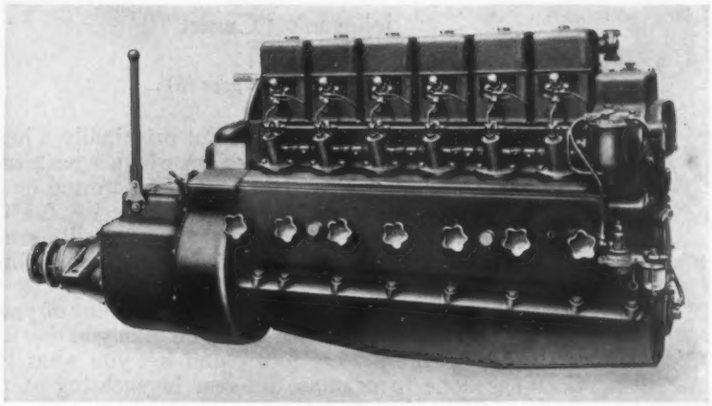
The New Low-Priced 15-Foot Utility Chris-Craft

One of the many innovations displayed by motor boat manufacturers at the New York Motor Boat Show at Grand Central Palace, was a new 15½-foot Chris-Craft utility boat listed at $495, and designed by Jay W. Smith, veteran boat builder.

This is one of the lowest priced boats in a full-size, inboard, standardized stock model ever offered, and is in keeping with the determined efforts of the marine industry to bring the cost of owning and operating boats within the reach of millions.

The new Chris-Craft is 15½ feet long, has a beam of 5 feet 5 inches, and is powered with a 4-cylinder marine motor, capable of driving the boat at speeds up to 25 miles per hour. The hull is of genuine Philippine mahogany, finished in natural color, with double planked bottom construction, which eliminates the necessity for caulking and adds to the sturdiness of the craft. An added feature is the tiller-type steering control which makes the entire cockpit available for riding or fishing purposes.

This model should be a popular boat for inland lakes, rivers, or bays. The introduction of an inboard motor boat of this type should receive a most enthusiastic reception from the boating public which, judging from the interest shown in this model at the Show, is as great as it was in 1929.



The new 6-cylinder, light-weight, 60 h.p. Fairbanks-Morse Diesel

Fairbanks-Morse Light Diesel

To meet the increasing demand for operating economy in comparatively small primary power equipment, Fairbanks, Morse & Co. have developed and recently placed on the market a light-weight four-cycle Diesel engine that provides an adequate capacity-weight ratio reliability, and long sustained performance ability.

This engine is designed for both marine and mobile equipment as well as for stationary service and is available in sizes of one, two, three, four and six cylinders with capacities of 10, 20, 30, 40, and 60 brake horsepower.

The cylinder size is 4¼″ by 6″ and the normal operating speed 1200 r.p.m.; the displacement is 85 cu. in. per cylinder and 5370 cu. in. per min. per h.p. at rated speed.

This line of engines is simple and easy to install, is easy to start, economical to operate, and exceedingly flexible as to control. The engine, as shown in the accompanying illustration, is exceptionally compact and clean cut and is withal ruggedly designed for hard service — features that have been found from long experience to be so essential to the successful operation of engines for both marine and stationary service.

All the engines in the series are of the vertical type with airless injection of fuel and embody the latest developments in light-weight full Diesel construction.

For electric generating service, these engines are available equipped with either A.C. or D.C. generators in capacities of 6 to 40 kilowatts.

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Bruns, Kimball & Co. Appointed Gar Wood Distributor

Bruns, Kimball and Company, Fifth Avenue and Fifteenth Street, New York City, are now distributors for Gar Wood standardized runabouts for Metropolitan New York, Long Island, a section of Connecticut, and New Jersey.

The entire display of Gar Wood, Inc., at the New York Motor Boat Show has been transferred to the Bruns, Kimball showrooms where the exhibit is now open for inspection. This exhibit included the New Gar Wood Model 16–35. This handsome runabout seats five adults comfortably and has a sustained speed of 34 m.p.h.

In addition to handling Gar Wood boats, Bruns, Kimball and Company is also distributor for Matthews Cruisers, Kermath motors, and Richardson Cruisers.

\+ + +

The New Dodge Fleet and Multiple-Vee Bottom

Dodge Boats for 1934 will include no less than thirty-five models, some of which will introduce an entirely new method of bottom construction which adds still more sturdiness and still more speed to Dodge Boats. The fleet includes both standard mahogany runabouts and a choice of the Utility Boats.

Of chief interest is the line of Dodge Utility Boats. The famous 19-foot Dodge Utility Boat, which has been sold all over the world, is continued with added improvements and new features. In addition, a 16-foot hull that is new this year, a new 20-foot hull, and a new 25-foot hull, present a choice of equipment and finish in models, with speeds up to 35 m.p.h.

The new Dodge multiple-vee bottom construction reduces side spray and insures dry riding in all weather. This construction has the tendency to build up "tracks" of water under the boat along which it skims at several miles an hour faster than with traditional methods of bottom design. In addition to greater speed and comfort, the new multiple-vee bottom makes for rugged construction. All Dodge Boats are built with double-planked bottoms, but the double bottoms in the new multiple-vee boats are fastened through three thicknesses of solid planking.

In addition to the widely varied line of Utility Boats, Dodge presents six standard runabout models ranging from 16 feet to 28 feet, and three de luxe sedans.

The Dodge Multiple-Vee bottom runabout construction. Below. A Richardson "Little Giant" cruiser on her way to Manila

50%

DISCOUNT

TO MAKE room for our new cruiser program, we are offering for immediate sale a few current model Sea-Lyon runabouts at less than the price of the motor alone. These are all brand new boats with new engines, sold with standard new boat guarantee. Demonstrations at any time by appointment.

Included in this offering are:

Five-28′ Sea-Lyon "40", 225 H.P. Kermath Sea Wolf
Six - 30′ Sea-Lyon "45", 225 H.P. Sterling Petrel
Two-30′ Sea-Lyon "50", 275 H.P. Hall Scott Invader

ALSO

Three-28′ and six-30′ standard hulls, complete with exception of motors.

Several used runabouts at prices proportionately reduced.

Sea-Lyon runabouts are known the world over as the last word in runabout quality — unexcelled in design, beauty and performance. The new Sea-Lyon cruisers will carry out the same traditions and enable us to serve the entire boating field — runabouts, cruisers and commuters.

Write, wire or telephone today for complete details. This opportunity will not last long or come again as this offer is positively limited to the boats listed above.

LYON-TUTTLE CORP.

285 King Street, City Island, New York, N.Y.

Phone: City Island 8-1645

Watch for the Sea-Lyon Cruiser Announcement — Coming Later

Johnson's "Comet"

(*Continued from page 63*)

she is a one-design boat which is not principally a high-geared racing machine, but rather one which is patterned after the standard racing class boat of all around qualities. The class has grown on its own merits, for the "Comet" was designed to meet those qualities and possibilities which are so much needed in the small boat class.

Looking at the question from the standpoint of yacht clubs interested in class racing, let me take you down to the tip of southern New Jersey and tell you what this boat has done to promote interest in yachting at the Stone Harbor Yacht Club.

Many of the members of this club already owned boats, or hastened to purchase one when joining the club, in order to enter the afternoon races which are features of the club's activity. The result of this was that in 1932 the racing was between a heterogeneous group of sailboats, ranging through all types, from one extreme to another. In size alone the fleet was most pretentious, but as the racing progressed interest in competition lagged as it was found almost impossible to classify the various boats and assign fair handicaps. The winner often won not because of superior racing skill but rather because of the design of his boat and the conditions of wind and water on that particular day. Realizing this, a committee was appointed to adopt a good one-design class. After studying the various types and qualifications of one-design boats, the sailors of Stone Harbor Yacht Club adopted the "Comet" as the official class boat of the club. The principal reasons for the selection were as follows:

1. It was the only shoal draft boat closely approaching standard racing yachts, and was designed by a master of the art of sailing.

2. It was ideal for the beginner, and yet it did not stop there, for it required refined sailing technique to get the most out of the little craft.

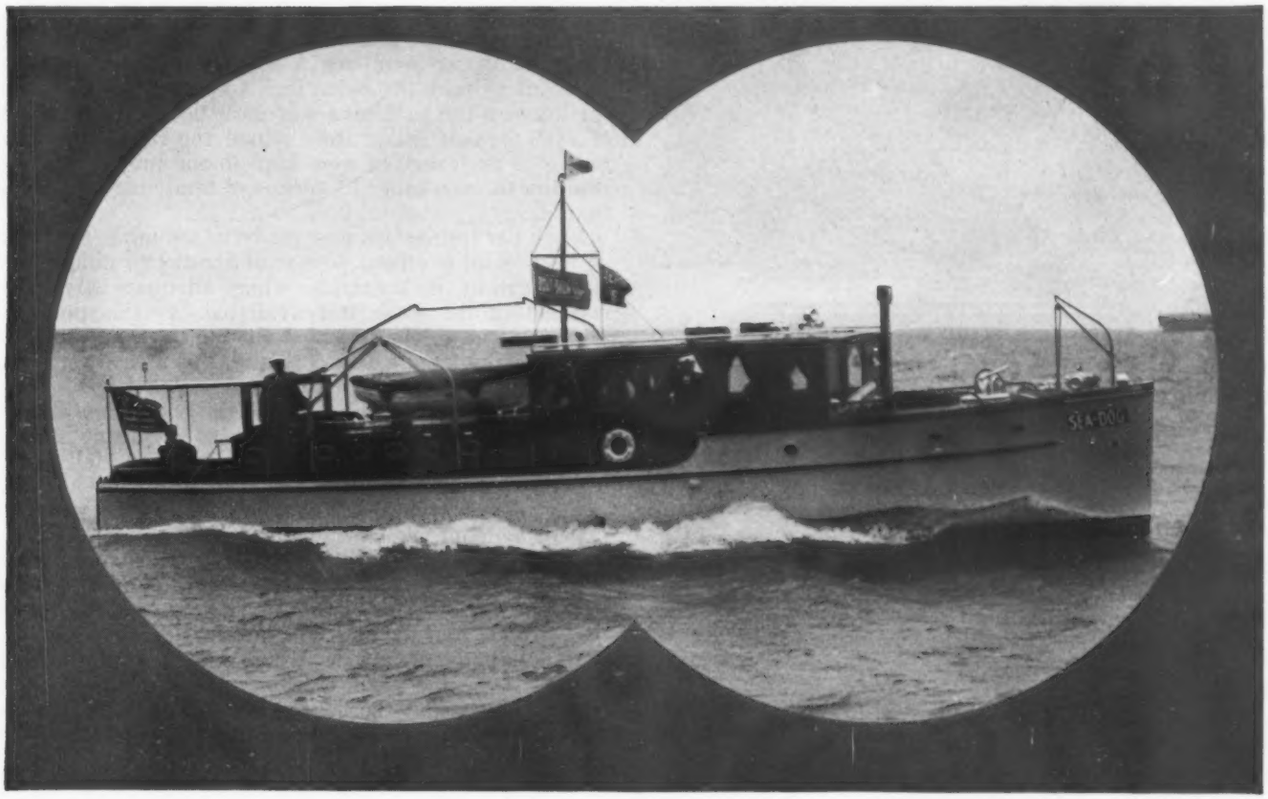
Today, after one year of activity with the "Comet" Class, the Stone Harbor Yacht Club has gained wide recognition in this field of activity and no less than twelve "Comets" will be racing in the club this summer. Five of these have already been built and the rest will be delivered in the spring. The outlook for racing has never been better, and the interest in the sport is shared by all the members who are able to take an active part in sailing, so that the attendance at the races has been increased 100 per cent. And this interest is spreading to other groups on the bay.

Others who became interested in the "Comet" have not been idle. In New York two organization meetings have been held, and the following officers have been elected: Dr. John Eiman, of Philadelphia, member of the Stone Harbor Yacht Club, President; John Black, of Medford, Mass., Vice-President; and Dr. Wilbur H. Haines, of Philadelphia, member of the Stone Harbor Yacht Club, Secretary and Treasurer. In addition, final rules have been made covering the dagger-type rudder, and metal centerboard, weighing not less than 100 pounds. Plans are under way for the publication of a booklet, to be sent out with each set of plans purchased, containing an outline and helpful hints for building. Soon "knock-down" parts will be available.

Since the introduction of the class, more than sixty boats have been built in various parts of the country. Class representatives have been appointed in these sections and the new "Comet" organization is functioning well. According to a report from Medford, Mass., a fleet of six "Comets" was taken to Marblehead, to the

On the "Sea Dog"...Sea Dogs See...

how Monel Metal *Propeller Shafts perform*



• *The 55-ft. cruiser "Sea Dog" built by Stephens Bros. at Stockton, Calif. This fine craft has been operated along the Pacific Coast by the H. A. B. Sneve Co. of San Francisco as a "Show Boat" to display marine equipment. Power is furnished by two 155 H. P. Scripps motors driving through Monel Metal shafts 1¾" dia.*

Pacific boat-fans visit in every port... "Praise Monel beyond belief"

In port after port, from San Francisco to Juneau, the "Sea Dog" tied-up and received a hearty welcome.

All the local skippers, owners and other "salts" clambered aboard for visits.

They came to see and admire this *Boat-Show Boat's* display of marine equipment offered by H. A. B. Sneve Co., of San Francisco and Seattle.

And among her most admired features were the propeller shafts...made of Monel Metal.

Mr. Sneve, the "Sea Dog's" Master, says: "The further the *Boat-Show Boat* cruise progressed, our enthusiasm increased over being equipped with Monel shafts and displaying a sample end in our pilot house. Many visitors who came on board either owned boats Monel equipped or were familiar with its merits, and praised Monel beyond belief.

"On two of the several times our propellers struck submerged logs we felt certain our shafts would be found out of line but their springing back qualities functioned perfectly. Both are still in their fine original condition and entirely free from corrosion."

Monel earns such praise by its steel-like strength and absolute immunity to rust.

It polishes-in to glass-smoothness, reducing vibration, power consumption, friction-wear and danger of seizing.

Ask your regular boat-yard man about Monel equipment...not only shafts and propellers, but also hull fastenings, bright-work, galley outfits and other accessories. Or, if you would like complete information in black and white, just drop us a line.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET, NEW YORK, N. Y.

Monel Metal is a registered trade-mark applied to an alloy containing approximately two-thirds Nickel and one-third copper. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

"SISTER SHIP"
.....OR "Poor Relation"?

IN THE SPRING, when they first go over, these class boats may look spic and span. Like as two peas. But in mid-summer.....?

A CHEAP "marine" paint used on the false basis of immediate economy may soon turn any sprightly craft into a down-at-the-heel "poor relation". A disgrace to her neighbors. Perhaps even a *danger* to her owner. You have to use a lot of such paint — often!

SMITH FINISHES are a positive safeguard to all wood surfaces against water, worms, sunlight, moisture. They are the result of 106 years of specializing. Time tells — not the label on a paint can.

NOW is the time to give serious thought to the question of painting *your* boat. Make full use of the advantages of the *known* quality and durability that SMITH FINISHES possess. A craft that's always bright is the natural birthright of every boatman. And the sea holds no compromise with safety.

SMITH will solve your individual painting problems. Ask our advice. Valuable literature at no obligation.

EDWARD SMITH & CO.

Makers of QUALITY Marine Paints and Varnishes Since 1827

Long Island City, New York

CUP DEFENDER FINISHES
SMITH

NRA

races, and five of the six placed in the lead over similar class boats.

So the "Comet" seems firmly installed in its realm and we look forward to the spring and summer to bring forth an increasing fleet. As you read the plans, and study the design, perhaps you, too, will feel as I do — that this is the boat you have been waiting for. This is the time to build one for yourself.

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How to Build a Skipjack

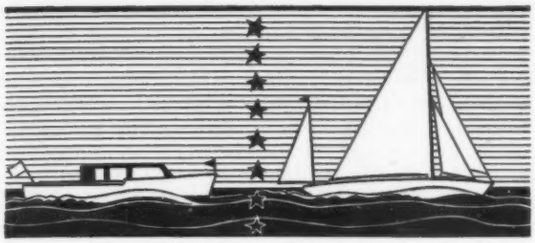
(*Continued from page 62*)

and adjusted to the required form. The side and bottom parts of each rib were secured to one another by a lap joint set in marine glue with two carriage bolts running through the two members. A notch was cut out of each lap joint to take the chine log. A spacing equal to the thickness of the backbone was made between the halves of each section where they joined the backbone. The halves of each section were kept in the proper relative position to each other by means of temporary diagonal braces.

With her framework now ready to assemble, the boat started on an overland voyage of about two miles from the garage to the boathouse where adequate space for completing the work was available. At this point it might be well to mention that the boat was not built in the vicinity of Long Island Sound, but in Hackensack, New Jersey, situated on the Hackensack River. Thus the maiden voyage of our boat to the Sound was anticipated with considerable interest, as it meant sailing through New York Harbor, not to mention Hell Gate, in a new and untried boat. The account of this eventful voyage is a story in itself, but as it does not deal with the matter at hand, we will return to the "overland" voyage. The backbone was carried to the river on a small express wagon. This procedure aroused many questions in the minds of the unsuspecting citizens of our peaceful home town, and, in addition, brought forth numerous remarks about our project which will no doubt remain with us for some years to come. What a relief it was finally to arrive at the boathouse and hide our masterpiece from the critical eyes of unsympathetic landlubbers!

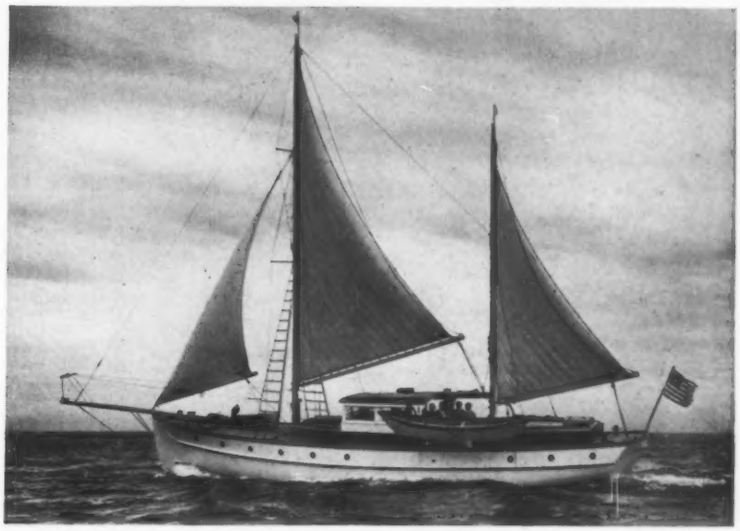
The backbone now assumed a new position in life, being propped up up-side-down in order that the ribs might be fastened to it and the bottom planked. Great pains were taken to level up the backbone both lengthwise and athwartships, to insure perfect alignment of the ribs as they were secured in place to the backbone. The ribs were fastened to the backbone by means of 1″ by 2″ oak cleats glued and screwed to either side of the backbone at the required stations. The bottom portion of the ribs were then glued and screw-fastened to these cleats, and, with the 1¼″ by 1¼″ oak chine logs steamed and bent into place, the resulting framework was remarkably rigid. At this stage we could really see the boat take form, and the rapid developments which followed changed her appearance so fast that at times it certainly did look startling. Every now and then we would walk off a distance from our work, and attempt to stand on our heads in order to get an idea of how she looked right side up. Perhaps one of the most fascinating experiences of amateur boatbuilding is to see the boat take shape, and to observe how she differs in appearance from what you imagined, as it is almost impossible for amateur designers correctly to visualize the finished boat from the flat blue prints.

(*To be continued*)



MOTOR-SAILERS

• William H. Hand, Jr., naval architect of New Bedford, Massachusetts, recently published a list of motor-sailers he had designed since 1927. Twenty such yachts were included, and exactly half of these were fitted with Hall-Scott engines. Of the fourteen built since 1929, nine had Hall-Scotts. Of the four built since 1932, *all* had Hall-Scotts.



No naval architect has had more experience in the design, and in the actual sea use, of motor-sailers than has Mr. Hand. The increasing use of Hall-Scott engines in his boats is high recommendation indeed.

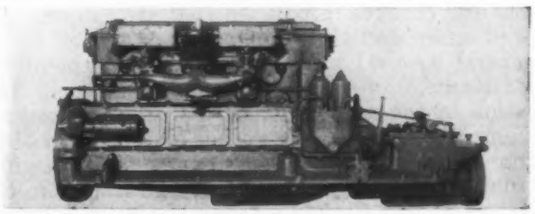
Mr. Hand's list included these motor-sailers

1927	Water Witch	46′	1930	Moonbeam *	65′
1927	Tamarack	50′	1930	Halaia *	68′
1927	Nor'easter	60′	1931	Pitt	46′
1928	Katherine IV *	55′	1931	Laval	50′
1928	Cachalot	85′	1931	Starfire	55′
1929	Mary Alice	46′	1932	Goosander *	58′
1929	Lady Lou *	55′	1932	Bluejacket *	60′
1929	Bluefish *	60′	1933	Seer *	63′
1929	Ungava	83′	1933	Seal *	63′
1930	Antares	105′			
1930	Audrey *	50′			

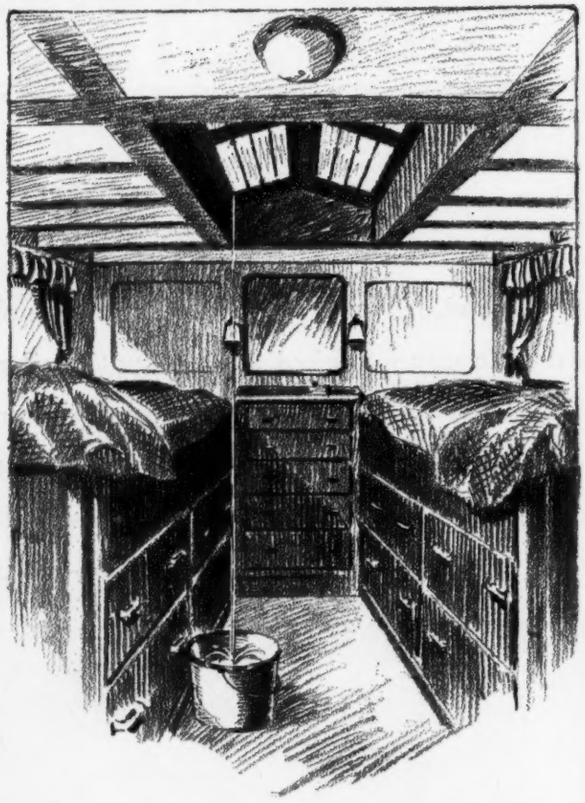
* Hall-Scott equipped

HALL-SCOTT MOTOR CAR COMPANY . . Division of
American Car and Foundry Motors Co.
254 West 31st Street, New York, N. Y.

BERKELEY, CALIF. • VANCOUVER, B. C. • LOS ANGELES, CALIF. SEATTLE, WASH. • DETROIT, MICH. • IN MIAMI, FLA, J. FRANK KNORR • IN NEW ENGLAND, MARINE EQUIPMENT COMPANY OF BOSTON, MASSACHUSETTS



Important reductions in prices have just been made. Write for the new prices on the entire line from the four cylinder, 50 h.p. FISHER JR., *to the six cylinder, 275 h.p.* INVADER. *There's a Hall-Scott suited to almost any marine use, fast runabout, cruiser, motor-sailer, or work boat.*



LEAKS from skylights, drawers which have to be pried open and the dozen other little annoyances which go to ruin the pleasure of yachting are unnecessary.

Our workmen know how to obviate these troubles. They are trained in the right way to do things, whether it be repair work, or a Jacob's built yacht.

⚓

ROBERT JACOB, INC.

CITY ISLAND, NEW YORK CITY

STORAGE REPAIRS

The Effect of Shape on Hull Resistance

(*Continued from page 50*)

believe form and wave-making to be completely separable parts of residual resistance. But I do believe that, if we think of them as more or less separable, we may succeed in advancing our thinking, and perhaps in clarifying some of the problems of resistance. The advantage of trying to separate them, even roughly, is similar to the advantage of separating skin friction from total resistance — if it gives us some idea of the relative magnitudes of the two parts, we may know better how to attack the whole problem. The application of this thought to the comparison in Fig. 4 does not prove that the two parts are separable, but it does go a long way toward some sort of rational explanation of the large differences between the residual resistances at speed-length ratios of around 1.0. Subject to further confirmation, of course, it tends to emphasize the importance of form resistance, even when comparatively large waves are present, and to make its reduction a matter of even more concern than would be the case if its sphere of influence were limited to very low speeds.

In concluding this discussion, let me emphasize my conviction that it is only by bringing together, for critical comparison, quite different shapes, that we can throw the whole problem of resistance into full perspective. The comparison between the steamship and the sailing yacht shapes has served to clarify three major factors in the problem. It has indicated the importance of form resistance, it has demonstrated the effect of a pronounced after overhang, and it has told us something of the behavior of different kinds of bows. These things are important. It has not produced direct evidence that steamships ought to look more like sailing yachts, or yachts like steamships. It could hardly do that. But it has suggested that the experience gained in working on one type may not be wholly foreign to the further development of the other type.

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Taking Advantage of a Shift of Wind

(*Continued from page 58*)

2. (It is obvious that if Boat 1 can overstand the mark by tacking, Boat 2 can do so as well, for she is ahead, and would be the weather boat if both boats went about. The same conditions would then govern as in Case 3.)

With these cases as a basis, it is easy to work out all the rules for procedure on a four-point shift of wind when ahead, behind, abeam to windward, abeam to leeward, directly to windward, or directly to leeward of a competitor. Every other position on the water can be worked out, as it were, by interpolation. Similarly, it is easy to work out the changes in position that are caused by a greater or lesser shift than four points.

In general, we can lay down certain rules of thumb for taking advantage of an anticipated shift of wind. The application of the rules must be tempered by general conditions of the race. They do not always apply. But far more frequently than most racing men imagine, these rules should be followed. It will be seen from the six cases cited that the old maxims of always covering the most dangerous competitor and always keeping between your most dangerous competitor and the mark do not invariably apply.

Here, then, are the rules of thumb, for an anticipated four-point shift.

"CANADIAN CLUB," happily, is one of those few products known the world over for consistent, unvarying excellence. When Hiram Walker, in 1858, founded this now vast business, he laid down hard-and-fast principles of quality and purity. Those principles have not been changed in 75 years. They are practiced faithfully today, in every process of distilling and leisurely mellowing "Canadian Club" — whose age is attested by the government's official stamp which seals the bottle. Those same principles are your assurance that any product bearing the name of Hiram Walker & Sons measures up to the high standards so evident in "Canadian Club."

Hiram Walker & Sons

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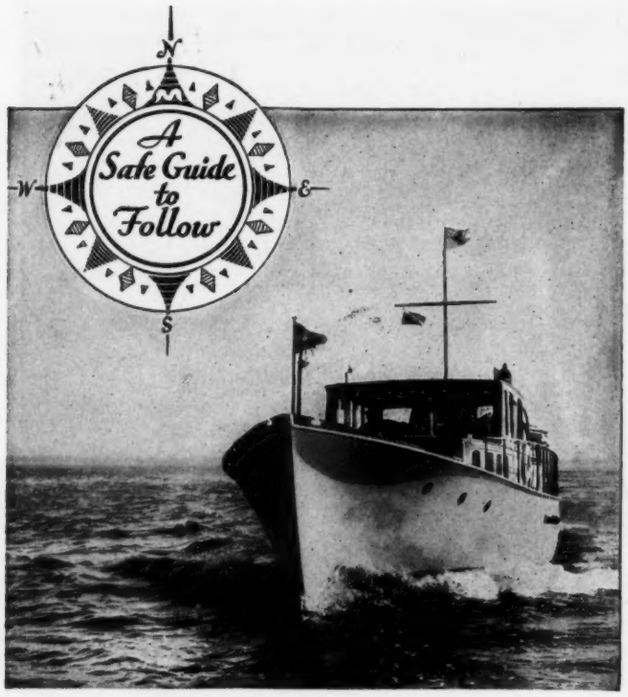
WALKERVILLE, ONTARIO , , PEORIA, ILLINOIS

This advertisement is not intended to offer "Canadian Club" for sale or delivery in any State wherein the sale or use thereof is unlawful.



An Atlantic Mutual Insurance policy meets all the requirements of yacht owners for the full protection of their craft.

Largest Company—Atlantic Mutual is the largest mutual marine and transportation insurance Company in the World. It was chartered in 1842, over 90 years ago.

A Mutual Company—Atlantic is a "Mutual" Company. Policyholders, even though they have a loss, share in the Company's profits. Present cash dividend rate is 15%.

Financially Strong—Atlantic Mutual is financially strong and writes a non-assessable, profit sharing policy at the usual market rates.

Satisfactory Settlement—Atlantic Mutual has an international reputation for prompt and equitable loss settlement.

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1. If you expect a shift of wind forward, get out ahead. On a four-point shift it does not matter how much you are to leeward, if you are two lengths forward of your opponent s beam.

2. If you expect a shift of wind aft, get out to windward. On a four-point shift it does not matter how far you are behind if you are two lengths to windward of your opponent's wake.

3. Stay on the side from which you expect the new wind.

4. If the wind heads you, tack at once.

5. If the wind lets you up, don't tack — not even to cover.

6. If you are behind and cannot guess the wind, the only position from which you will gain on any shift of wind is directly to leeward.

This last is directed to those who lack the gambling spirit. From this position the gain is certain, but small. One does not win races from this spot, except on time allowance.

With good guesswork on the part of the skipper who follows these rules, a slow boat can beat a faster boat whose skipper guesses wrong or does not follow these rules. Of course, where wind is considered, the guesswork is frequently wrong, even among the most weatherwise. But it pays to know how to play the cards even if the dealer is sometimes unkind.

\+ + +

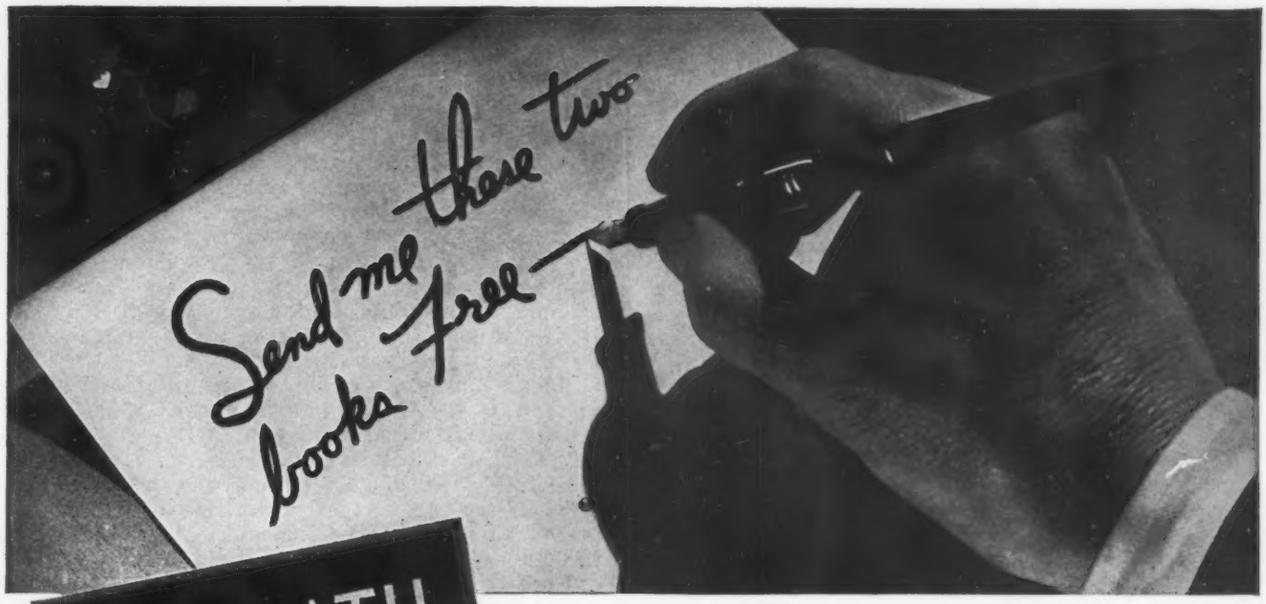
Why Glorify the Rule-Breaker?

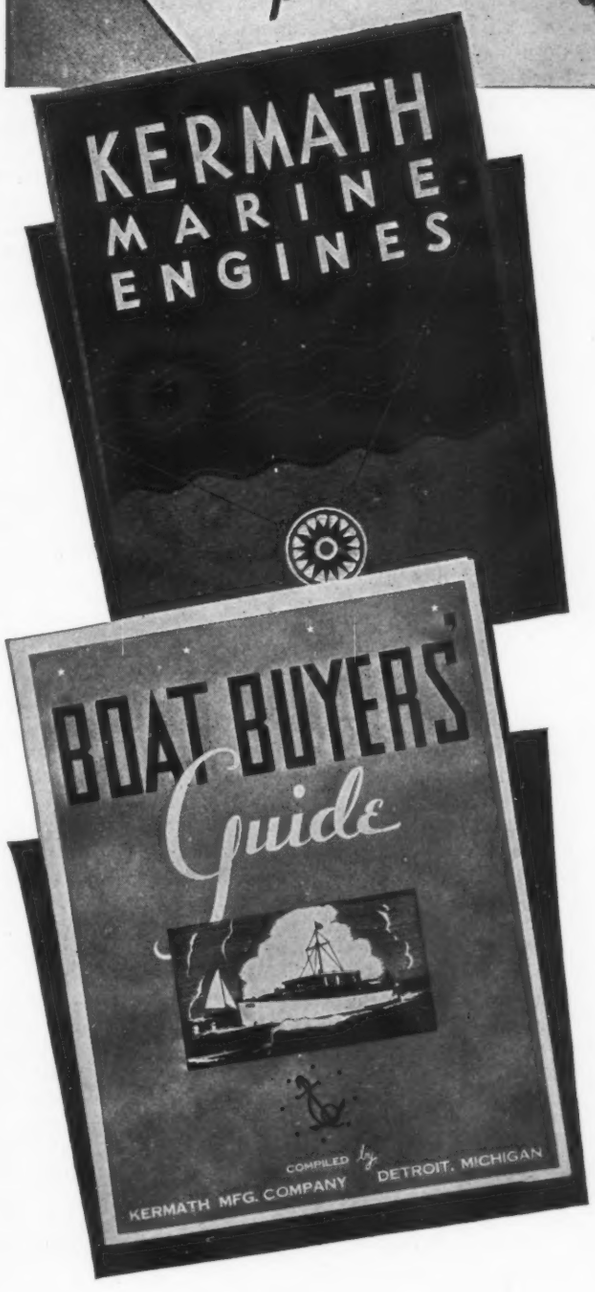
(Continued from page 54)

majority of skippers race year after year without getting into any sort of difficulty. In twenty years, the writer has been protested only once, never been disqualified, and never been forced to withdraw, except when disabled. It is usually the same small group that is continually in difficulty and causing trouble for everyone else. Strange to say, they are usually good skippers who could win without having to resort to questionable tactics.

Every rule in the rule book is there for a very good reason — either to avoid accidents at sea or to prevent some form of unfair practice. There is no excuse for not knowing the rules or for not observing them. The rule-breaker in yacht racing is no more entitled to public sympathy than the reckless automobile driver, who endangers life by disregarding the traffic regulations in our city streets. Both are a menace.

If the racing rules are unjust, if disqualification is too severe a punishment in certain cases, then it is up to the international body, that makes the rules, to change or modify them. Such power is not vested in the local officials who conduct races, nor is there anything in the rules that suggests that they be disregarded in the event of extenuating circumstances. Such an interpretation would breed a complete disregard of rules in any branch of sport. The duty of any official conducting any sporting event is to establish the facts; then, if a rule has been violated, to impose the penalty provided under the code of rules that governs that sport. Sympathy, prejudice, or the friction that might be caused among certain factions, are considerations that can play no part in the decision of any honest official. To keep any sport clean, rules must be enforced, not in one case out of ten, but in every case — regardless of whether the violation was unintentional, due to ignorance, or even unavoidable. Perhaps no accident occurred, no benefit was gained, no harm was done. The point is that such might have been the case. By violating that particular rule, the risk of





YOU'LL want this new Boat Buyer's Guide if you are at all interested in a new boat. It is profusely illustrated with all types and kinds of motor boats. It contains a fund of information covering the favorite models of America's leading boat builders. It tells you where to find just the boat you may be seeking.

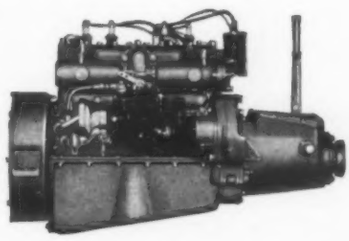
This Boat Guide will be mailed free together with the new 1934 Kermath Marine Engine catalog. Write for them today—mailed free without the slightest obligation. This is simply another service Kermath offers you to help get the most pleasure from boat ownership. Other technical information pertaining to your own individual problems will be gladly supplied on request.

Your attention is likewise invited to Kermath's new series of marine engines—33 distinct models to serve any and every boating need—the most extensive marine engine selection built anywhere in the world. Revised prices enable you to pick the correct motor size at the right price.

And remember—every Kermath is designed for hard-boiled marine usage. That's why it pays to specify a Kermath for rugged dependability and soul-satisfying performance. Get ALL the facts before you buy!

8 H. P. TO 450 H. P.—
2 TO 12 CYLINDERS

This is a view of a new low-priced 4-cylinder, 45 horsepower Kermath model designed for small runaboats and fast stepping light cruisers. Equipped with starter, generator, flame arrester, fuel pump, extra heavy clutch and reverse gear.



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FOR YEARS, boat owners have sought a yacht white that retains its whiteness, that keeps cabin exteriors and hulls sparkling with lasting beauty.

Such a white can now be obtained, thanks to more than five years of research by du Pont chemists. It is Dulux Yacht White — a white that is wholly different from any other yacht white.

Dulux white *stays* white. It is free-flowing, self-leveling, quick-drying. It gives an extremely hard, tile-like finish that won't collect dirt readily. It resists discoloration by hydrogen sulphide gases often found in harbor waters. It cleans easily without injuring the surface.

Dulux Yacht White is one of a number of Dulux Marine Finishes — a new type of marine finish developed by du Pont. These finishes assure longer-lasting beauty, fight salt air and salt spray, provide greater durability, and dry more quickly. They have proved these superior qualities on ocean liners and on all kinds of smaller pleasure craft.

For full information about Dulux Marine Finishes see your marine supply dealer or write to E. I. du Pont de Nemours & Co. Inc., Finishes Division, Wilmington, Del.

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MARINE FINISHES

accident, possibility of harm, opportunity for unfair advantage, existed, and the rule-breaker must be penalized.

The chronic protester, who is spoken of with such scorn, is the only one who is trying to preserve law and order. In few cases does he seek to acquire a piece of silverware or get his name in print. Those are the false motives ascribed by people who probably know nothing about the conditions involved. He is seldom of the firebrand type, but usually a quiet, careful and honest skipper who knows his rules and is willing to sacrifice local popularity in an attempt to have them enforced. There are usually only one or two in a community with sufficient gumption to protest. The rest sit back and grumble, and let these one or two do their dirty work for them and gain the reputation of being chronic protesters for trying to keep the sport clean.

Race committees should try to realize that they have no right to alter, modify or ignore the rules. They are in exactly the same position as officials conducting baseball, football, tennis, or any other sport. They are local officials in charge of a given event, and entrusted to run it under the rules made by a parent body. The only criticism a race committee should justly fear is that of being lax and failing to do its duty in this respect. If we did not have lax race committees we would not have careless skippers, and if we did not have careless skippers there would be no fouls and no protests. Of course, almost every foul is due to carelessness and not to any deliberate attempt to cheat; but the whole question boils down to this: Is yacht racing to be a free and easy form of afternoon amusement, with skippers who are incapable of learning or observing the rules regarded as morons for whom allowances must be made? Or is it to be treated like an organized and recognized major sport?

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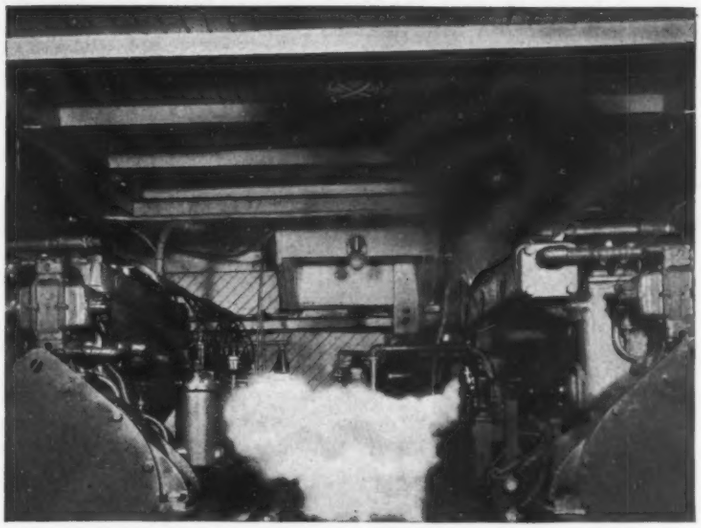
Generators and Gadgets

(*Continued from page 39*)

provide the best and safest electrical arrangements possible and these may be rendered useless by the carelessness or stupidity of the man in charge. Explosions and fires are few and far between; in most cases they may be traced to the carelessness or stupidity of the operating personnel and but seldom to a material failure. Any operator of a gasoline engine must remember that gasoline is volatile and that a small quantity of its vapor makes an explosive mixture with a surprisingly large percentage of air; also, that this mixture is heavier than air and will sink to the lowest place in the boat. There it stays, in many cases undisturbed by any ventilation, an ever-present menace. The lower the generator is placed, the greater the chance of a spark igniting the gases in the bilge. There have been boats in which the generator has been below the engine room floor. A tight floor in the engine room may be an advantage as thus the gasoline vapor is kept out of the bilge and kept higher in the boat where there is at least a chance that the engineer may smell it.

In conclusion, let me urge owners not to save money on the electrical outfit of their yachts. As is the case with everything else about a boat, the best is the cheapest in the long run, and a few dollars saved in installation, whether on labor or material, may be the cause of subsequent trouble and annoyance, perhaps even of danger, to say nothing of added expense. Insist on proper marine material, whether in wire, fittings or generator; material that is designed for the severe conditions to be met afloat. Regarding the electrical outfit, the old saying applies: "There's no sense in spoiling the ship for a ha'p'orth of tar."

NEW SAFETY FROM FIRE

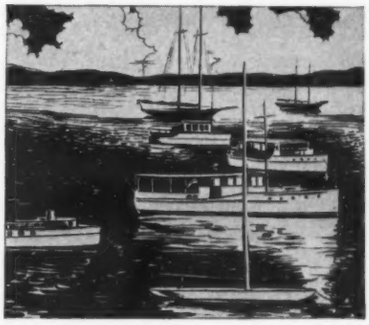


Fire extinguishes itself! The first flash of flame releases the system and floods the engine space with fire-killing Lux gas.

NEW LUX-O-MATIC SYSTEM OPERATES AUTOMATICALLY—FROM FLAMES OR EXPLOSIONS

SMOTHERS GASOLINE AND OIL FIRES IN 3 SECONDS WITHOUT HUMAN AID

FOOLPROOF NON-ELECTRIC OPERATION MAKES SYSTEM 100% RELIABLE



Always on the job! Spontaneous combustion cannot steal your boat when no one is on board.

As safe afloat as at home! The Lux-O-Matic System takes the place of the fire department and ends your fire worries.

Watches over your sleep! When off on a cruise, fire cannot surprise you during the night.

THERE has been a new step forward in safety at sea! Results against over 500 fires have proved the effectiveness of manually operated LUX Systems. Now the new Lux-O-Matic System makes this same protection available entirely independent of the human element.

Now fire on a boat actually extinguishes itself. Backfires, gasoline leaks and short circuits no longer need endanger you and your friends on board. Spontaneous combustion no longer can destroy your boat at its mooring.

The new Lux-O-Matic System is very different from other automatic extinguishing devices. It is operated by explosion as well as by fire. It is completely non-electric. It is the first and the only automatic carbon dioxide system approved by the Underwriters' Laboratories for boats.

A heat detector installed in the engine space releases the Lux-O-Matic System. Operation of the detector floods the engine space with LUX carbon dioxide gas from keel to deck. The gas smothers fire instantly.

Before you launch this season, investigate the Lux-O-Matic System. It costs no more than manually operated LUX Systems did a few years ago. And it forever removes all danger of fire from your cruises.

LUX-O-MATIC FIRE SYSTEM

The New Automatic LUX Fire Extinguishing System for All Sizes of Cruisers, Auxiliaries and Yachts

SEND FOR THIS FREE BOOKLET

"The Boat That Won't Burn" is the title of a new booklet describing the new Lux-O-Matic System. It tells how you can make your boat safe from the most severe fire. Write to Walter Kidde & Company, Inc., Bloomfield, New Jersey.

The Words "LUX" and "Lux-O-Matic" are trademarks of Walter Kidde & Company, Inc.

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Big Winds and Little Breezes

(Continued from page 32)

voyages from remote antiquity. Long before the advent of steam the monsoon greatly assisted communication by sea between the Mediterranean region and southern Arabia, the Persian Gulf, India and Ceylon, for at the season of the year (May to October) when northerly winds prevail over a great part of the Red Sea, the southwest monsoon blows from eastern Africa to the Malabar coast; while the northeast monsoon, blowing from October to April, coinciding with southerly winds in the Straits of Bab-el-Mandeb and the southern Red Sea, favored the return passage.

Our wind explorer will wish to witness the "burst" of the southwest monsoon — the violent thunderstorms and torrential rains with which this seasonal wind announces its arrival on the Indian shores — and he may enjoy this privilege off the southern Malabar coast about the beginning of June. By that period cyclones have become a serious possibility over the Bay of Bengal. If one comes along, well and good; but the intrepid sailor will not waste time hunting for one of the two severe storms of this class that occur in Indian waters, on an average, each year, because he is en route to the seas where typhoons are more frequent.

The height of the typhoon season is in September. Thus there is plenty of time for a detour for the purpose of rounding up a number of less famous breezes; first through Malacca Strait, to pick up a jolly little sumatra, and then south to circumnavigate Australia. Along the shores of New South Wales it would be no unusual luck to run into a black northeaster, followed immediately by a southerly burster, which the Admiralty Pilot tells us is "the most remarkable squall wind of the many that are characteristic of various parts of the earth." The burster is a fine example of a line-squall, attended by a striking fall in temperature.

Proceeding northward, the navigator cannot fail to collect some of the many local breezes that diversify the monsoons in the Dutch East Indies, the attributes and queer names of which are most fully set forth in Dr. Braak's great work on that region. Crossing the Sulu Sea in July or August, he may feel the fury of a colla, a southwesterly gale attending a low.

The meteorological establishments in the Far East have developed a system of radio weather reporting so efficient that the movements of every typhoon on the neighboring waters are known almost from hour to hour throughout its career. Thus our yachtsman's burning desire to get into the clutches of a full-fledged storm of this category should not be difficult to gratify. He may even have the luck to pass through the "calm center" — which is calm as to wind, but quite the reverse as to sea.

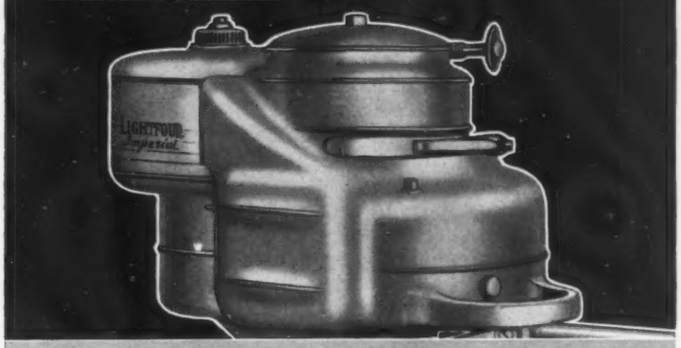
If he should survive this adventure, he will turn his prow to the eastward and will presently be bucking the northeast trades. He will find them, like trade winds everywhere, far from steady and regular. The trades rarely depart from the easterly semi-circle and perhaps never subside to a dead calm, but their capricious fluctuations in both direction and force are a surprise to the mariner who encounters them for the first time. Moderate squalls are not uncommon.

The proximity of the Hawaiian Isles in winter affords an opportunity of observing an interruption of the trade winds, in the shape of a kona storm, blowing from southwest or south. When the trades reassert themselves they may send down the windward slopes of the islands the vehement blasts known as mumukus.

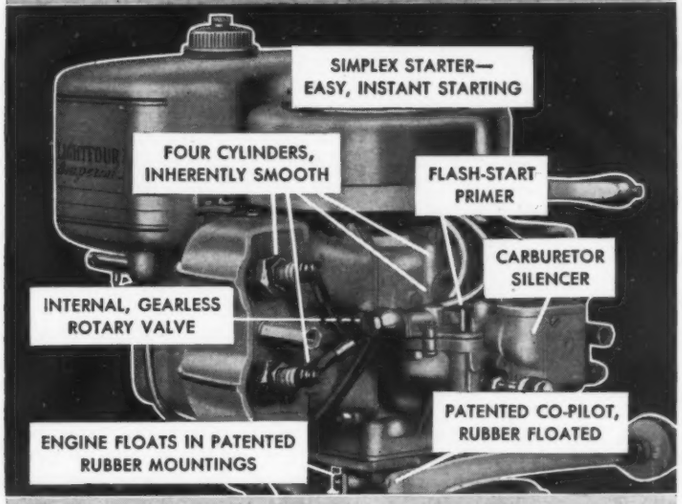
The next goal is the west coast of Central America, where first-rate northers may be enjoyed in winter. Between the Gulf of Fonseca and the Gulf of Tehuante-

Of course you want Hooded Power!

Hooded Power gives complete motor protection • spotless cleanliness • added quiet • handling ease • enriched appearance



—and decidedly you want what's under the hood!



THE outboards you've wanted are here. Only by driving one can you learn how superbly smooth and quiet they are . . . literally, riding seems like sailing! Your Evinrude-Elto dealer will welcome the opportunity to demonstrate.

SINCE Imperial models were first announced, thousands have wondered, "Will one of them fit my boat?" In practically two cases out of every three the answer is "Yes". The Imperial *Lightwin* weighs only 47 pounds, the *Lightfour* only 58 pounds. They develop, respectively, 5.5 and 9.2 N. O. A. certified brake horsepower at 4000 R. P. M. Only the very smallest type of craft requires less power and weight, only the users of fairly large or fast hulls want more power or speed.

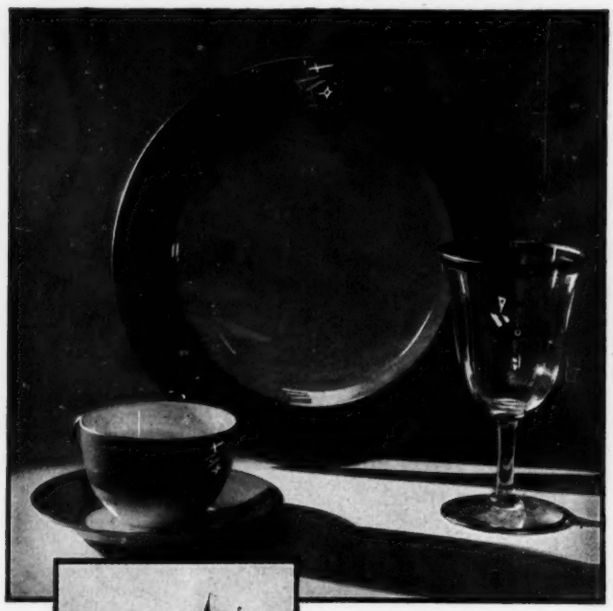
For years outboard motors have been blazing new trails in reducing weight-per-horsepower. The new Imperials now step out with the lowest weight-power ratio in their respective classes. Despite weight reduction, safety margins have been increased. New engineering, new costly materials accomplish this—the Imperials' new silent spiral drive is one significant example.

"A twin that fires like a four—a four that's smooth as an eight" — portrays the basic smoothness of the two Imperials. To finally isolate boat and driver from every trace of remaining vibration the engines are *floated* in two large rubber bearings. Even the steering handle with its patented Co-Pilot feature is rubber floated.

The Evinrude and Elto lines for 1934 include a full range of lighter motors (weighing as little as 29 pounds), bigger motors and motors for specialized service. Prices as low as $79.50. Write for Silver Anniversary catalog. Outboard Motors Corporation, 5643 N. 27th Street, Milwaukee, Wisconsin.

· Elto · EVINRUDE ·

1909—SILVER ANNIVERSARY OF OUTBOARD MOTORING—1934



EQUIP YOUR SHIP AT OVINGTON'S

Whether you plan to slide a new ship down the ways or tune up the trusty old gondola — there are ship's things you'll be needing this Summer. For instance — ship's china, crystal and silver. Better do your chandlering at Ovington's! Ovington's has exactly what you want — at just about the prices you care to pay!

OVINGTON'S

Yacht China, Crystal, Silver . . . 3rd Floor

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Pipe these new Lenox china patterns with crystal to match. Ivory bodied with gold edge with bands in color. Dinner plates from $36.50 a dozen. Other pieces in proportion.

pec they are called tehuantepecers; farther south, papagayos. Another well-known blast of this region, the cordonazo, does not blow until autumn, but it is hardly worth waiting for. It is merely the right-hand semi-circle of a cyclone traveling northwest off the coast.

The next experience is to cross the doldrums, the equatorial belt of cloudy and rainy weather, calms and squalls, lying between the northeast and the southeast trades. One of the great problems of the old sailing ships was to find a place for the crossing where this obstacle to a speedy voyage was relatively narrow, and it was partly with a view to this desideratum that Lieutenant Maury, in the middle of the last century, undertook the construction of his epoch-making wind charts. The doldrums are quite irregular and variable in shape and size, and, like the trades, they shift a few degrees north and south in the course of the year, following, with a lag of a month or more, the annual movement of the sun.

It is autumn in the southern hemisphere, but spring according to our northern calendar, when the hardy mariner, having traversed the southeast trades of the South Pacific and the belt of ambiguous breezes beyond them, invades the Roaring Forties. Here he may verify for himself one of the recent discoveries of cyclonology. Though sailors have been "running their easting down" for centuries in the "brave west winds" of these latitudes, the nature of the winds was strangely misunderstood until the present generation.

We now know that these boisterous westerlies of the Southern Ocean are not, as they were once thought to be, a permanent stream of air, like the trades. There is, to be sure, a general west-to-east drift of the atmosphere in that region, but the strong west winds occur intermittently on the northern borders of westward-moving cyclones, centered farther south, their direction being "clockwise" about the center, in accordance with the rule applying to all cyclones of the southern hemisphere. By the same token, the winds at any one place generally shift, with the passage of the cyclone, from north or northwest through west to southwest; but a vessel may travel eastward fast enough to keep pace with the storm, and thus may hold a fair wind for days together.

The traveler will not tarry longer in the Roaring Forties and the Furious Fifties than is necessary for rounding the Horn. Shaping his course to the northward, he will skirt the Falklands, which are notoriously scourged with winds, and will find a sheltered anchorage at Montevideo or Buenos Aires, where he will await the coming of a pampero. Any month of the year may bring pamperos. These squalls blow up enormous clouds of dust, much of which is likely to be showered down as mud, along with heavy rain.

It is now summer in the northern hemisphere. The explorer will loaf northward along the South American coast, sampling such local breezes as the minuano, the terral and the terre altos, and reaching the Caribbean in August and September, in time for a hurricane. In the Gulf of Mexico he may enjoy an early norther in October.

What then? He might spend years upon years in further wind-chasing. It is now almost the season for the harmattan, which carries Saharan dust a hundred miles to sea off the west coast of Africa. Far northward, cataract-like fall winds tempt him to the Norwegian fjords, and magical foehns will be turning winter into summer on the coast of Greenland. Far southward, on the South African coast, the southeaster will be spreading the "table cloth" — the most famous cloud in the world — over Table Mountain (unless it is a "blind" southeaster, which leaves the mountain clear). Scores of other interesting breezes invite him to various corners of the globe.

But this long-winded chronicle of winds must end somewhere.

On dining well

O NOBLE gastronomic muse, descend . . . and inspire this discourse . . . !

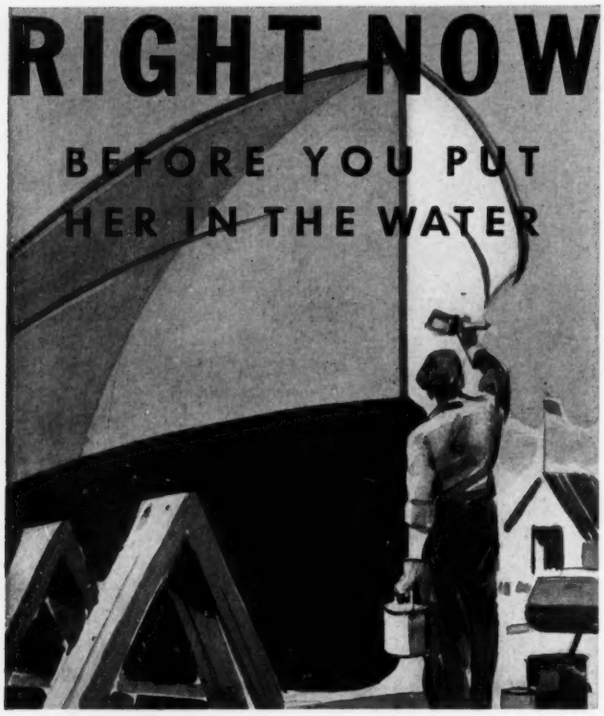
The joys of eating beautifully prepared food are perhaps more immediate, complex and compelling than those derived from any daily experience. For what other art calls at once upon the four senses of taste, touch, sight and smell? Such a complicated variety of stimuli is reserved for devotees of the culinary cult.

Aboard a French Line ship there is proper reverence for the pleasures of the table. The cuisine is acknowledged, by *gourmets,* to be a triumph of French talent. (Which is natural enough, since a French chef is at his best in his native setting.) Throughout the ship, with each repast, good table wines are served. In addition, the wine steward will suggest, if you wish, an accompaniment of fine old vintages . . . at surprisingly moderate prices.

Dinner conversation on France-Afloat is likely to be seasoned with wit. (A congenial group travels French Line.) The service is perfect (English-speaking). The appointments modern, comfortable. And Breton seamanship, bred deep for centuries, assures a carefree crossing.

A voyage to Europe via French Line is, in fact, a study in pleasant living. Yet it costs no more. . . . *And shipboard expenses have been adjusted to the value of the dollar.* Ask your travel agent to help you plan a trip on France-Afloat. There is no charge for his services. . . . French Line, 19 State St., New York City.

French Line PARIS, March 17, April 7 and 28, May 19 • ILE DE FRANCE, March 24, April 14, May 5 and 26 • LAFAYETTE, March 11, May 16 • CHAMPLAIN, April 3 and 21, May 12, June 2



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Address_____

A Single-Handed Atlantic Passage

(*Continued from page 36*)

should screw and *bolt* so many spare spars to the deck, and that I should have two mainsails, four forestaysails, five jibs, spare parts for the motor, such a number of tools, and everything else in no small quantity. When he saw me taking on board thirty cans of petrol, 200 pounds of sea biscuit, a hundred tins of milk and so on, he began to mumble and shrug his shoulders. But when a huge cylindrical package arrived from Paris words failed him. He was in the habit of cutting the string from all packages and, mechanically, he opened this one.

So one day, on returning from shore, I found him intently checking a big roll of marine charts which were spread out on his knees. He raised his head and asked pertly, "What are all these?"

"Can't you see by yourself they are maps?" I replied. "Well then," he said, "what are you going to do with all that — the coast of Morocco, Cuba, Florida?"

"Never mind those," I said, "it's a mistake." The trouble was that there were the corresponding nautical instructions and the American Pilot Charts.

The only person who knew from the beginning about my plans was a friend in Douarnenez. He wished to go with me, but now I explained why I could not take him. But he wanted at least to help me until the last minute and to see me off for good — or forever. When we were alone, we put *Winibelle* alongside the quay at Port Rhu, where the coasting vessels meet, and spent a fortnight screwing, hammering, sawing, rearranging things again and again. In between times we paddled about along the muddy roads in our wooden clogs.

The wind blew steadily from the S.W., chasing gray clouds across the sky and bringing rain. Everybody was in a good mood, despite the murky weather and the stench of the drains which empied out into the river just alongside the boat. Every evening, I conversed with my wife over the telephone. I also rang up Paris to get the time from the Observatory to regulate my chronometer. This was quite an affair, and I was victimized by the telephone operators, who, every few seconds, would urge me to speak. They could not be made to understand that I was listening to the automatic machine at the Observatory. Finally, convinced that they dealt with a maniac, they refused to give me the connection!

Time passed, all was just about in order, but I did not want to get underway with the wind from the S.W. which would have prevented my making Cape Finisterre. As yet, I did not know whether I would call at Madeira; at any rate, the sailing route for North America and New York leads close by the island, on one side or the other.

\+ + +

At seven in the morning of May 7th, a tendency of the wind to shift to the West brought me to an abrupt decision to set out. I put in a reef and rigged a small jib. The weather was cold and wet, and I was in a beastly mood owing to my having caught a chill some days previously. In five minutes I bade farewell to my friend Bob, who had spent the last few nights on board. He was still anxious to go with me and only with great difficulty restrained himself from insisting on doing so. In five minutes he packed off, and stood there on the quay, all alone, watching *Winibelle* sail slowly down the river. It really pained me to leave him there, silent and reproachful.

In Morgat Bay, I tacked all morning against westerly winds. Rain obscured the horizon and I was quite exhausted from violent fits of coughing. Towards the end of the afternoon, I passed the Raz de Seine and at six

AGAIN THE TALK OF THE SHOW:

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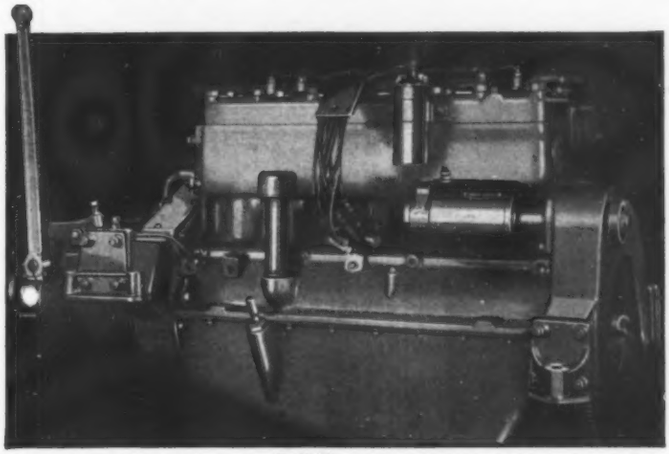
Chrysler builds more engines than any other marine engine manufacturer.

The foremost and most progressive boat builders use Chrysler engines as standard equipment, because good engines and good boats go hand in hand.

These builders have selected Chrysler marine engines to assure outstanding performance and dependable, economical operation.

They also know that behind the Chrysler engines stands the strongest marine dealer organization in the industry, giving unequalled service when need arises to the users of Chrysler-powered craft.



NEW 70 H. P. ACE MAKES HIT WITH BOAT BUILDERS AND OWNERS ALIKE

Chrysler's new low-price, rubber-mounted 70 h.p. "Ace", exhibited for the first time at the New York Motor Boat Show, will be standard equipment this year with such great builders as Chris-Craft, Gar Wood, A.C.F., Dee White, Wheeler, Hacker, Whitney Woodcraft, Holtz, Baltzer and others. It is available in high and medium duty types and with 2.56 to 1 reduction gear.

VINCENT ASTOR SELECTS "CHRYSLER POWER"

Vincent Astor, one of the greatest yachting enthusiasts, is the owner of "Little Nourmahal", Wheeler Playmate cruiser, powered with two Chrysler Majestic CMR 8-cylinder motors with reduction gears.

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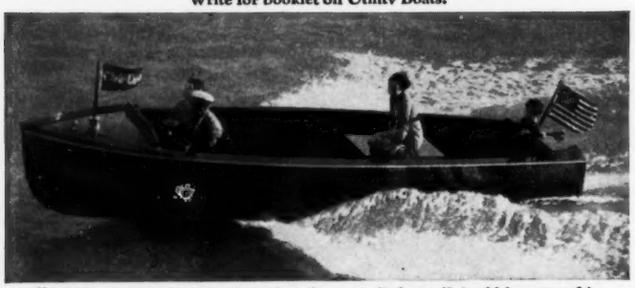
CHRYSLER MOTORS • AMPLEX DIVISION • DETROIT, MICHIGAN

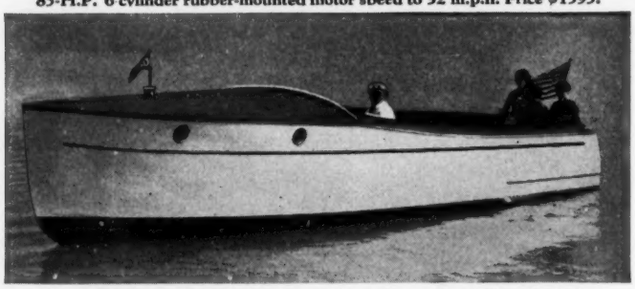
CHRIS-CRAFT UTILITY BOATS PRICED FROM $495

Sensation of the New York Show, this new model brings a full-sized genuine Utility Model down to the price of an outboard. Built of genuine Philippine mahogany, double-planked bottom and batten seam sides, 4-cylinder, 32-H.P. with 25 m.p.h. speed, operating costs are lower than a small car. Priced at $495.

Chris-Craft Utility models may be equipped with a demountable wood and glass top or with a Navy type, canvas-folding top for shade or shelter. The canvas top folds completely out of the way or can be used to shelter the whole or sections of the boat. Model shown is No. 70 and 71, with speeds up to 28 m.p.h. and 32 m.p.h. Priced at $795 and $925, respectively. Write for booklet on Utility Boats.



"Dad says we can operate it as cheaply as our little car." And it's a great big 21-foot Chris-Craft Utility Boat. As Model 72 it is equipped with a 4-cylinder, 55-H.P. Chris-Craft rubber-mounted motor, with speeds from 3 to 25 m.p.h. Price $995. As Model 73, it has a 6-cylinder, 70-H.P. rubber-mounted motor with speeds to 28 m p.h., priced at $1175. Model 74—85-H.P. 6 cylinder rubber-mounted motor speed to 32 m.p.h. Price $1395.



Here's a Utility Cruiser with living and sleeping accommodations for 2, that will win its way into your heart. 24 feet long, 7′ 9″ beam, 12′ 3″ x 6′ 6″ cockpit, seaworthy, and fast. Built in Models 80, 81 and 82 (differing only in power plants). Speeds, 21, 24, 28 m.p.h., priced at $1295, $1475 and $1695. Built with all of Chris-Craft's exclusive features. For construction details write for our Cruiser folder.

CHRIS-CRAFT CORPORATION, 403 Detroit Road, Algonac, Mich., *Factory Branch*, 6 W. 52nd St., New York

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(196-U)

o'clock I had doubled the Tower of La Vieille. At ten I lighted the lamps and navigation lights and let the boat run wind abeam. Two days later, 210 miles out, in a slight mist, I overtook a lobster boat and, at noon, exchanged a few words with her. She had left the same day as *Winibelle* and was bound for the coast of Mauritania. I lost sight of her during the evening. Shortly afterwards I found the steamer routes.

Eighty miles from Finisterre, a stiff blow from the S.E. forced me to take in two reefs. But it enabled me to double without making a tack, for the winds had always been too short from the beginning. Towards nightfall, I caught sight of another lobster boat, but this one was overtaking me, her dark brown sails spread, and looking grand. Naturally, she went round in a semi-circle so as to avoid me, when she found that she dealt with only a small yacht so far out at sea. Perhaps she feared that I would ask for something — they are like this nowadays.

It was exactly a week after leaving Brest that I found myself due east of Finisterre. In another week, at the end of the day, I sighted Porto Santo, thirty miles north of Madeira. I preferred to land there rather than on the island of Madeira itself, which is guarded on the east by the islands of Desertas and Bugio which are not lighted. I lay close-reefed and hove-to during the night, between Porto Santo and Madeira, waiting for daylight to enter Funchal, where I came to anchor in the little harbor of Pontinha, among a crowd of small boats and launches. It was early in the morning of May 25th. I had decided to call at Madeira, as I had noticed that the rudder head suffered from too much strain when the tiller was lashed, in spite of the fact that the rake was as small as possible and the rudder head was very strong. I could have strengthened it with bolts and some hoop iron that I had in reserve, but I preferred to have two iron bands forged for tightening, with two flanges, between which the tiller could be bolted; this is the most reliable device I know of. I might mention that I had devoted an entire day to trying out the two triangular wings which were meant to enable the boat to sail herself dead before the wind, in the trades. Here I was attacking a problem which, to my knowledge, has never been solved in a really practical manner, and many people had predicted that the idea could not be made to work. In reality, I never expected my device to work in rough weather with a heavy sea following, nor in calm weather either; but I wished to put it to the test. At first I was greatly disappointed; the boat was continually luffing to one side or the other and the braces would not run in the blocks. I remember that, in anger, I struck my fist on the railing so hard that I hurt my hand; but this at once made me laugh again and I set about trying other arrangements, all of them temporary, but which finally gave results. The boat ran before the wind all the latter part of the day and all night at 3.5 knots without my standing at the helm.

At Funchal I had the iron bands made for the rudder. The triangular wings were rigged, I had the boat repainted and revarnished on the outside, and the inside ballast rearranged. I had taken 1,200 kilos on board at St. Malo but this, I had found, was too much, so I threw about half of it overboard in the harbor, to the great delight of divers, for it was good lead, and the customs there would not allow me to put it ashore.

Madeira I liked very much, and my stay there was rendered delightful by the hospitality accorded me. The people are picturesque and most kind-hearted. As Captain Slocum wrote, one can nowhere find people so kind and hospitable as those living on small islands. Three sailors lent me a hand, every day; they were always joking and singing and they would never accept any payment for their work.

(To be concluded)

Good News!

Hub Erickson announces that this year will see the greatest motor boat and sportsman's show ever attempted in the Middle West.

Dates . . May 6 to 13
Navy Pier . . . Chicago

Displays . . . There will be over two miles of displays — all in one room — all kinds of boats, from rowboats to cruisers; fishing tackle, camping equipment, guns and ammunition, trailers, outdoor clothing, cameras and movie outfits, binoculars, outboard motors, engines and marine equipment . . . just about everything in the way of sports merchandise . . . and many resort displays.

Entertainment . . . Music and pretty gals . . . street singers and wandering musicians . . . blossom queens . . . log rolling . . . Indians . . . motion pictures . . . motorboat races . . . stunt riding, etc., etc.

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Prizes . . . Each day there will be attendance prizes . . . everything from red flannel underwear to a boat . . . including sports equipment and outboard motors . . . there will be valuable prizes for all the contests.

Don't Miss This Show—All in one room, the greatest gathering of outdoor equipment and boats . . . resort interests and entertainment ever attempted in Chicago. It will help you start your summer in the right way.

Mark the dates on your calendar . . . May 6th to May 13th

For further information write

National Boat and Sports Show

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Many grades of duck always carried in stock.

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Men at Sea

(Continued from page 44)

Gyle lolled in his bunk, toying languidly with a coddled egg, scanning the chart with an air of martyrdom. I glanced at him briefly on my way aft to relieve the wheel. I had come to regard him with a positive aversion, a complete distrust, a profound contempt — combustible feelings that required only the slightest friction to make them flame into the expression of a bitter resentment. In the last analysis, mine was the sole responsibility if we met disaster. James Gyle need not share it. He had prepared his alibi in advance.

As I climbed the companion ladder he raised himself on one elbow, and said smugly: "We'll pick up the island by ten o'clock — on the starboard bow." He was so cocksure that I had an impulse to contradict him.

Pat Kelley came to me an hour or so later, looking puzzled and crestfallen. "I'm about four hours out in my reckoning, according to Jimmy. I figure we'll make the landfall about two o'clock and it'll be to port."

"What makes you think Jimmy's right?" I asked.

"He's the navigator," Pat said simply.

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Dragging hip boots, Gray clambered to the foremast-head and hung on resolutely until hunger forced him down. Gyle was jauntily indifferent to the failure of his prognostications. He blamed the chronometer. Kelley doggedly took a noon sight, still wearing a nonplussed expression — and nothing else. James Gyle regarded him with a supercilious smile, maddening in its implications of mingled scorn and pity.

It was a lazy, lovely afternoon. Four bells had struck, echoing over the lonely sea, when Gray, who had regained his perch on the foremast, stretched an arm toward the misty horizon to port.

"Land, ho!" he sang out.

We altered course to the east'ard. Within half an hour the island was visible from the deck. Still intangible, phantom as a mirage, it floated on the sea lightly as a feather from a seabird's wing — a stroke of indigo between the luminous blue of the sky and the prismatic flow of waters. The sun glanced flashing from clustered roofs like alabaster amid the somber cedars of the hills.

Gyle, draped in the starboard rigging, shaded his eyes from the glare, stared thoughtfully across the dazzling pattern of the chameleon sea. He turned an anxious face as I came abreast of him and handed me the binoculars. "I can't make out North Rock." His voice was petulant as a spoiled child's.

I had raised the glasses to my eyes when Pat Kelley spoke from the lee of the foresail which had screened him from us. Slowly, incredulously, he said "North Rock! I've had it in sight for ten minutes. It's to port!"

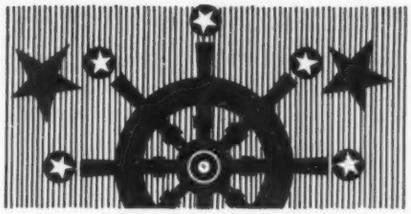
At that moment, between us and the enticing shore, the crest of a wave was upflung — a white arm raised in warning.

"'Bout ship!"

The schooner spun on her heel, and above the thunder of the slatting canvas the reedy voice of James Gyle, navigator, piped: "Well, fellows — I saved your lives! A matter of another minute and we'd have piled up. I saw that reef just in time. You've got me to thank for *that!*"

But nobody thanked him. Nobody said anything for a while, in fact, except Horizontal Herman, who prefaced his remark with a mirthless chuckle and (to the astonishment of us all) assumed the perpendicular as he made it.

"Gum drops!" he exclaimed, "I thought you told me you could navigate!"



The new A.C.F. "30" is an excellent day cruiser or all purpose boat with really comfortable overnight accommodations when needed. With its unusually large after cockpit and complete cruising conveniences it makes a fine yacht or sailboat tender. Full headroom throughout, and all screens of never-rusting Inconel metal. A six cylinder Chrysler Crown Engine, mounted in rubber, gives 17 m.p.h. A great value at only $3275.*

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Thanks, Yachtsmen

Thanks to each and every one of you gentlemen who honored the Hotel Lexington by wining, dining, or living with us during the Motor Boat Show * We are intensely pleased that so many of you stopped with us. As you know, the house was filled to the roof. We hope you were comfortable and happy and that you had a good time. We hope you will come often. If there was any single thing, no matter how small, that did not please you, I'll consider it a personal favor if you will let me know about it * Until we meet again...safe voyages and many of them.

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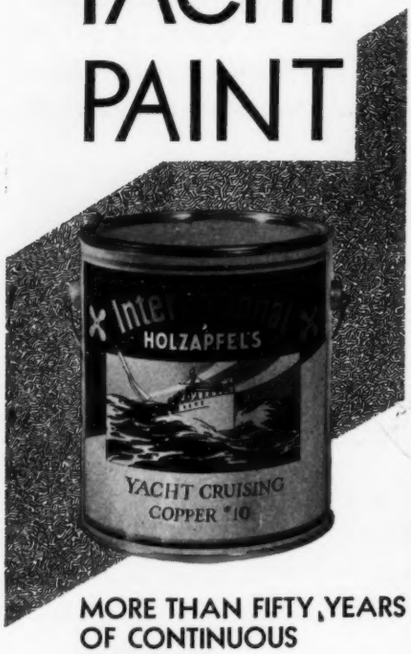

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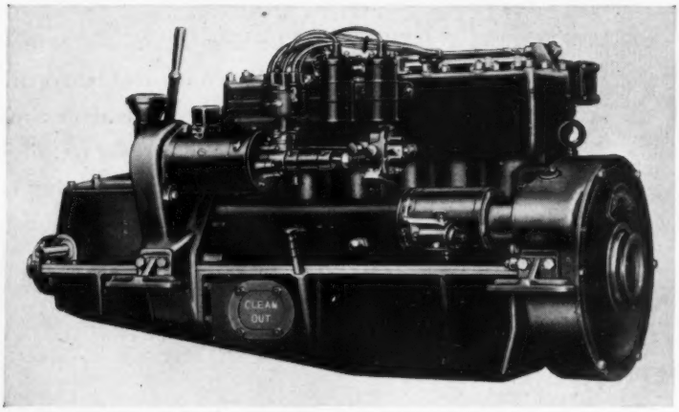

The new Gray Six-75, a rugged motor which is ideal for cruiser, auxiliary, and workboat installations where reliable service is required

Gray Cruiser, Auxiliary, and Workboat Motors

The Standard Gray Line of cruiser, workboat and auxiliary motors comprises 5 "Fours," 6 "Sixes," and two styles of the Gray "Eight," with a power range from 80 h.p. at 1000 r.p.m., to 125 h.p. at 3000 r.p.m. These motors are all specifically designed, built, equipped and tested for economical power and long life at speeds suited to the heaviest cruisers, workboats and auxiliaries, where large propellers are most efficient. Special higher-powered manifolding, carburetion and compression are available at regular prices when maximum power at higher speeds is required, as on reduction gear and "Vee-drive" gear installations.

These cruiser-type motors are entirely different in appearance and design from the Gray "Phantom Series" of high-speed and racing engines. These differences are apparent externally in their complete enclosure, the location and type of accessories, the enclosed chain or gear drive for these accessories, and the use of heavy gray iron housings and base. Internal differences are more basic and far reaching in their results, and extend to such matters as camshaft design, pistons and piston clearance, bearing size and quantity, manifold design, carburetor settings, spark advance curves, and even different spark plugs.

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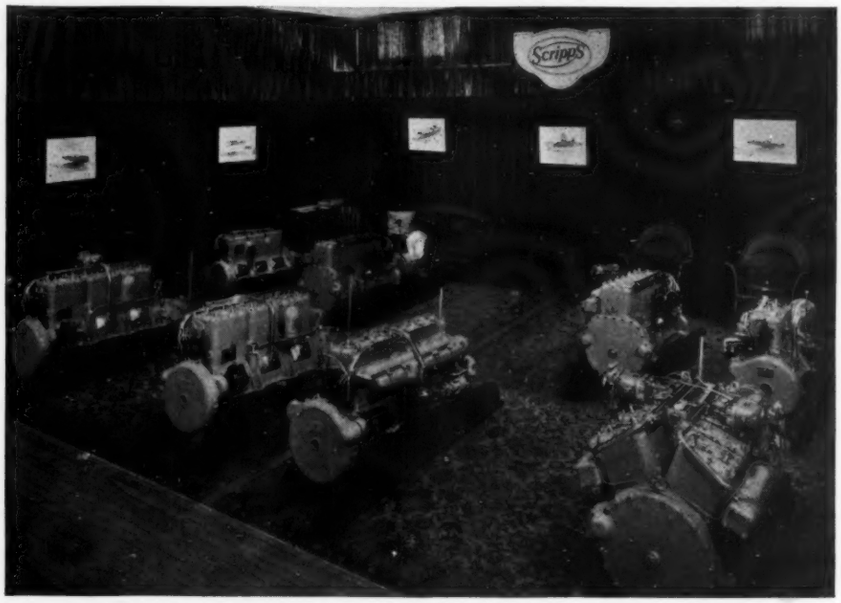
Kermath Service Station in Miami

In response to demand, and because of the increasing yachting activity in Florida, the Kermath Manufacturing Co., of Detroit, Michigan, has established a sales and service station under the supervision of Walter A. Kieswetter in a new and modern store building located at 234 S.W. 6th Street, Miami, Florida.

Besides carrying a complete stock of parts and accessories for Kermath motors, there will be displayed in the building the latest Kermath models. In addition, the stock of parts will be quickly available to Kermath's 141 associated dealers throughout Florida, as well as to thousands of Kermath owners in the State. Visiting yachtsmen are invited to make Mr. Kieswetter's store their port of call.



The handsome Scripps exhibit at the New York Motor Boat Show included fours, sixes, twin sixes and a V-12

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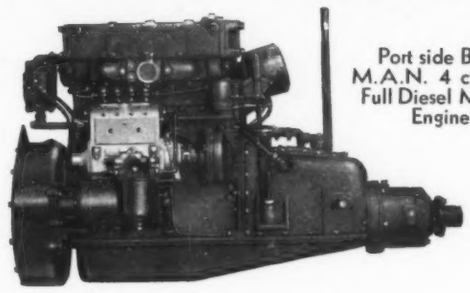

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The New Buda 4 cylinder Full Diesel engine has what every small boat or auxiliary owner needs. Greater safety. Greater economy. High speed operation — 32 to 40 h.p. The Shock Absorber Head, that means smoother operation than ordinary Diesels — and behind it is the long experience of a Company that has *proved* it knows how to build Diesels.

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